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S U P P L E M E N T  
TO THE FOREGOING  
LECTURES  
ON  
COMPARATIVE ANATOMY.  
VOL. VI.

LONDON:  
Printed by A. & R. Spottiswoode,  
New-Street-Square.

# S U P P L E M E N T

TO THE FOREGOING

## LECTURES

ON

## COMPARATIVE ANATOMY.

BIBLIOTH.  
COLL. REG.  
MED. EDIN.

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*ILLUSTRATED BY ENGRAVINGS.*

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By SIR EVERARD HOME, BART.

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VOL. VI.

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LONDON:

PRINTED FOR LONGMAN, REES, ORME, BROWN, AND GREEN,  
PATERNOSTER-ROW.

1828.



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## P R E F A C E.

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IN bringing before the public these two supplementary volumes on Comparative Anatomy, I have communicated all the materials of any importance, which I have been able to collect, during a longer life spent in this pursuit than most men engaged in scientific investigations have enjoyed.

The six volumes, taken together, are filled with researches in Comparative Anatomy, that were begun at seventeen, and have been uninterruptedly continued to seventy-two,—a period of fifty-five years.

It is to the late John Hunter I owe the love of the pursuit, and his example both of application and the mode of investigation I have never lost sight of. To him I am indebted for the rich stores which he placed before me, which it has been the height of my ambition to increase; and my life has been continued beyond what is considered the usual period allotted to man, with the

possession of my faculties sufficiently perfect to carry on my pursuits. Early habits have made me prefer the entertainment resulting from the exposition of the beauties of nature, and the delight to be derived from examining the works of the Creator, in which infinite wisdom and intelligence are displayed, to all other amusements.

I am now enabled to connect together the separate investigations contained in these volumes, by means of a general explanatory index, in two parts; one of the letter-press, the other of the plates.

In this way the materials of the different lectures will be brought into one regular course, so far as reference is concerned; and the plates will, by such an index, form one regular series, in which every representation will be brought into its proper place.

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ERRATA IN VOL. V.

Page 192. line 3. *for* containing *read* contained in.  
249. lines 4. and 6. *for* lama *read* al paca.

DIRECTIONS FOR THE BINDER.

All plates to face on the same side as the title-page.  
All explanations to face the opposite plates.  
All folding plates to be on guards.



## EXPLANATION OF THE PLATES.

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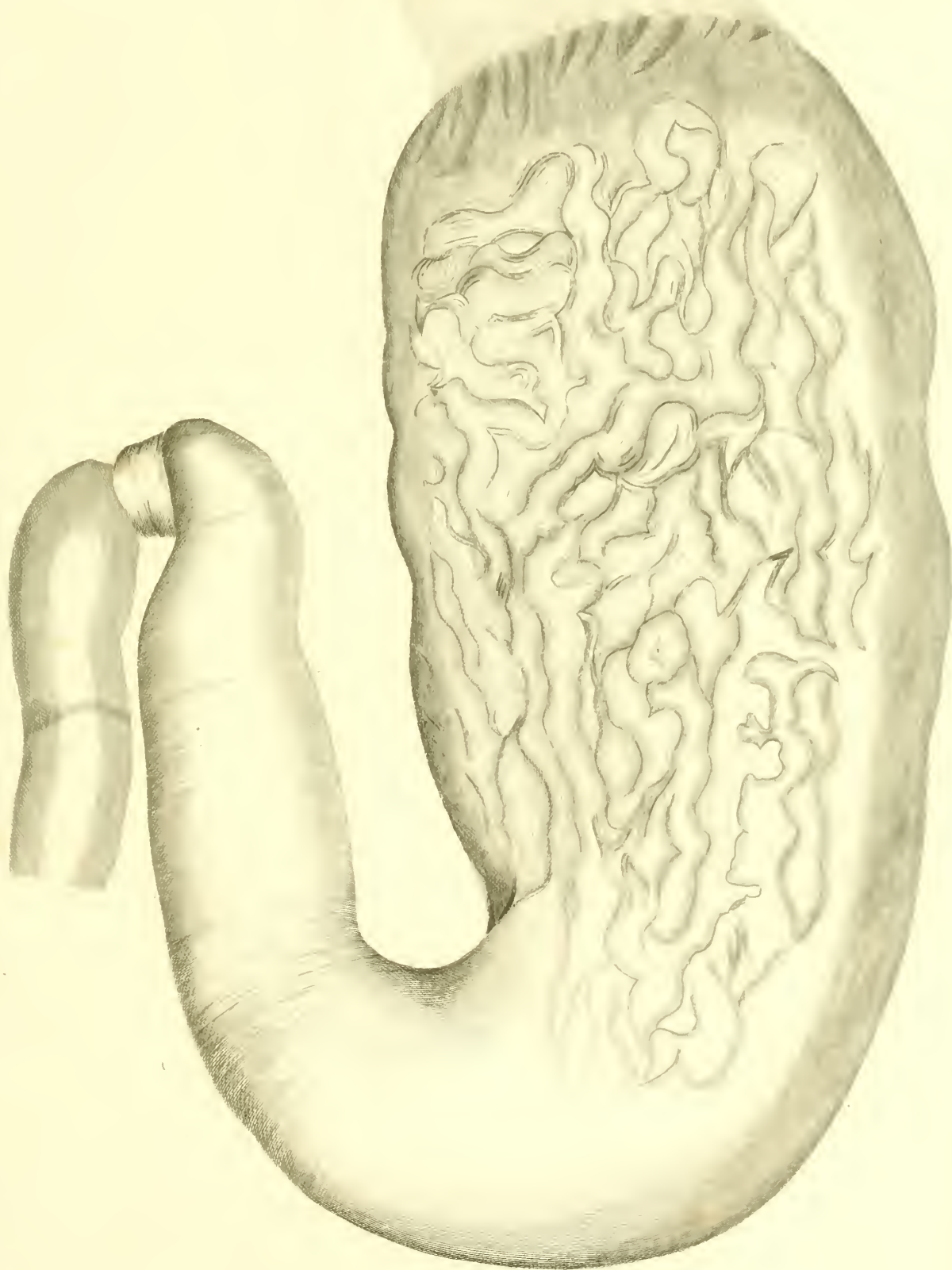
### PLATE I.

In which the Internal Cavity of the STOMACH of the WALRUS  
is exposed.

The stomach of the walrus inverted to show its internal surface, upon a scale of an inch to a foot.

The oesophagus is lined with cuticle, which terminates in a transverse line at the orifice of the cardiac portion.

The cardiac cavity has a deeply rugous internal surface, while the pyloric is quite smooth: there is a valvular fold at the pyloric orifice which is extremely small, and has a strong ligament surrounding it, so as not to admit of regurgitation from the duodenum into the stomach.



one Inch to a foot



## PLATE II.

The GALL-DUCT of the WALRUS, with its termination in the Duodenum.

Fig. 1. shows the manner in which the gall-duct terminates in the duodenum : the engraving is upon a scale of six inches to a foot.

Fig. 2. shows the gall-bladder diminished to the same scale, and laid open, as also the large duct leading to the gut, till it penetrates through the coats of the duodenum.

These parts are distinct from the liver, lying directly behind the duodenum, and connected to it by cellular membrane ; one of the ducts by which the bile is brought to this reservoir is also shown.

This structure is not met with in any other animal that I know of. This animal has no ductus communis collidicus ; but the bile is received into the bladder or reservoir by small canals, and only thrown out at intervals into the duodenum.



Fig. 1.

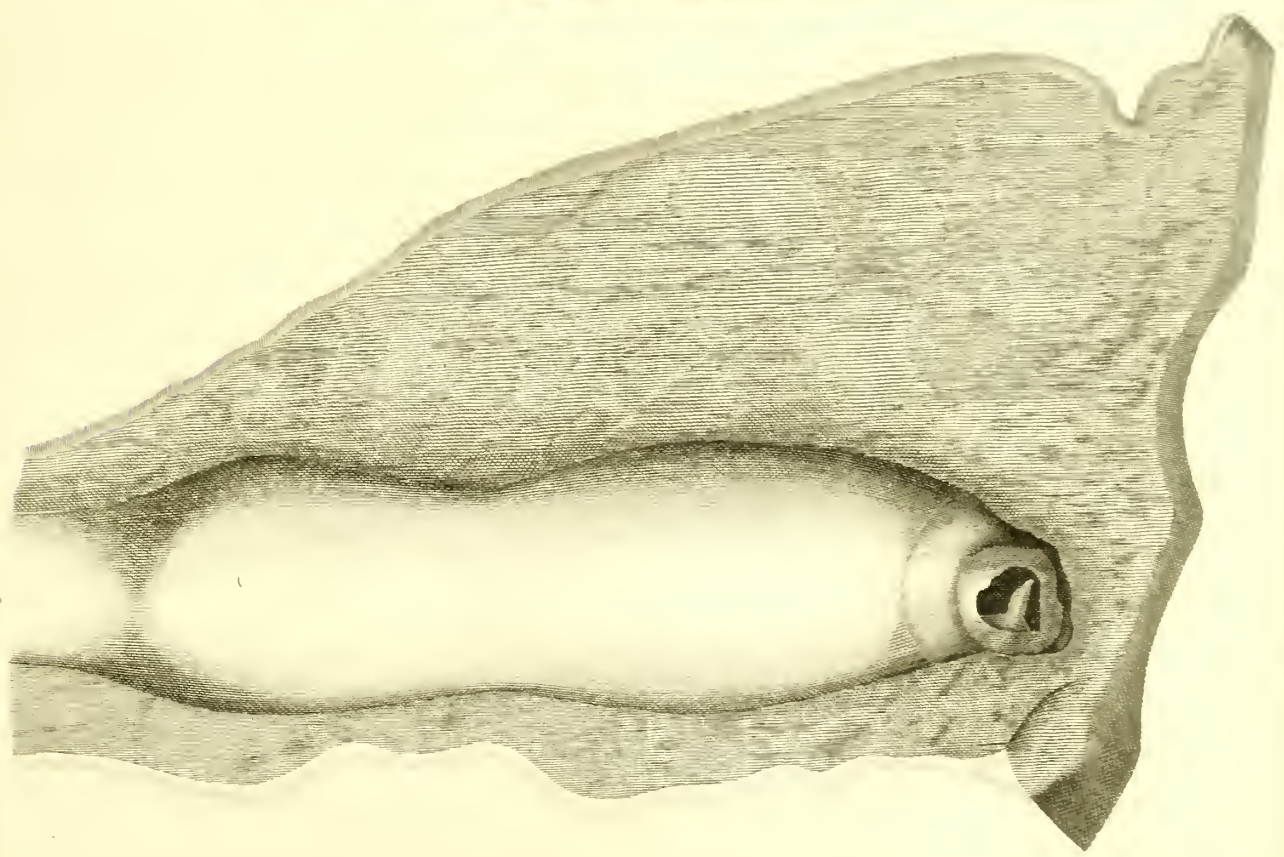
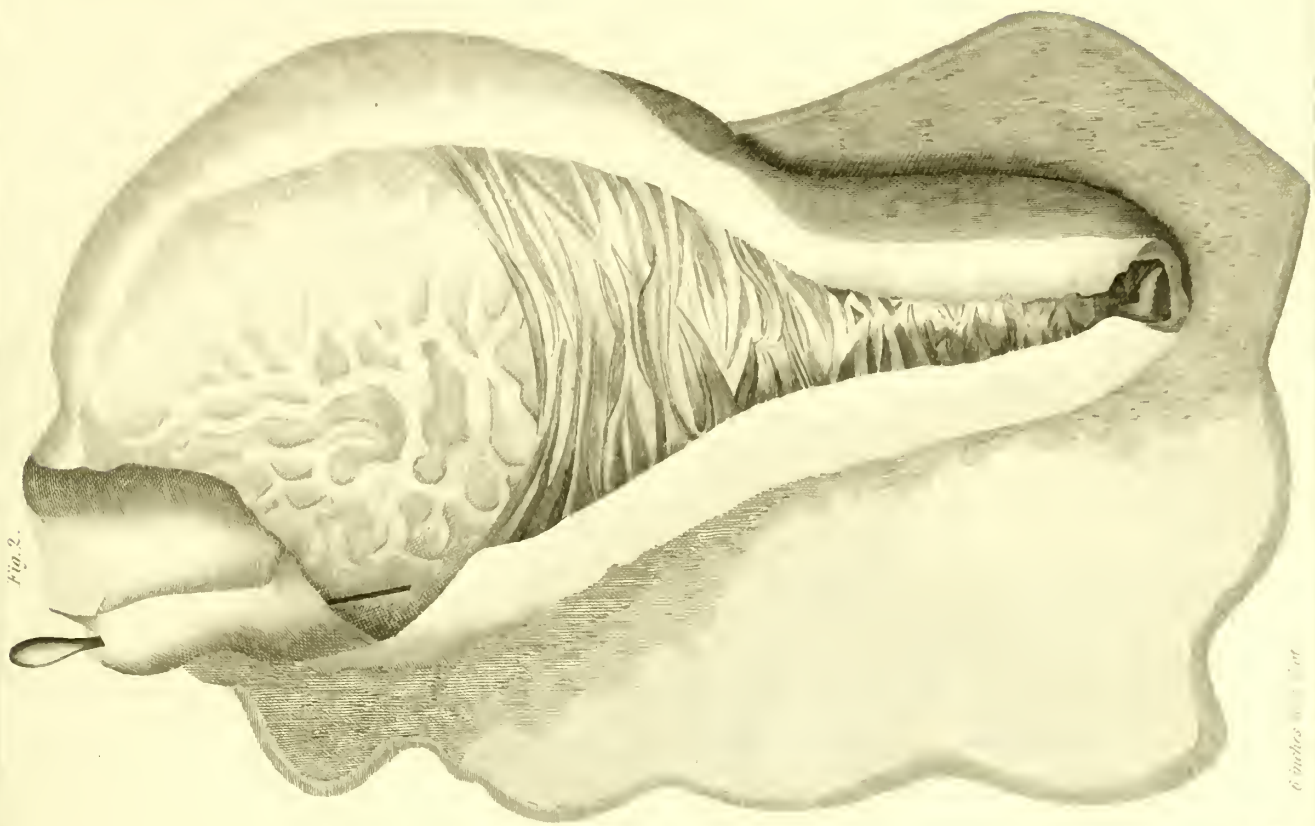


Fig. 2.



6 inches





### PLATE III.

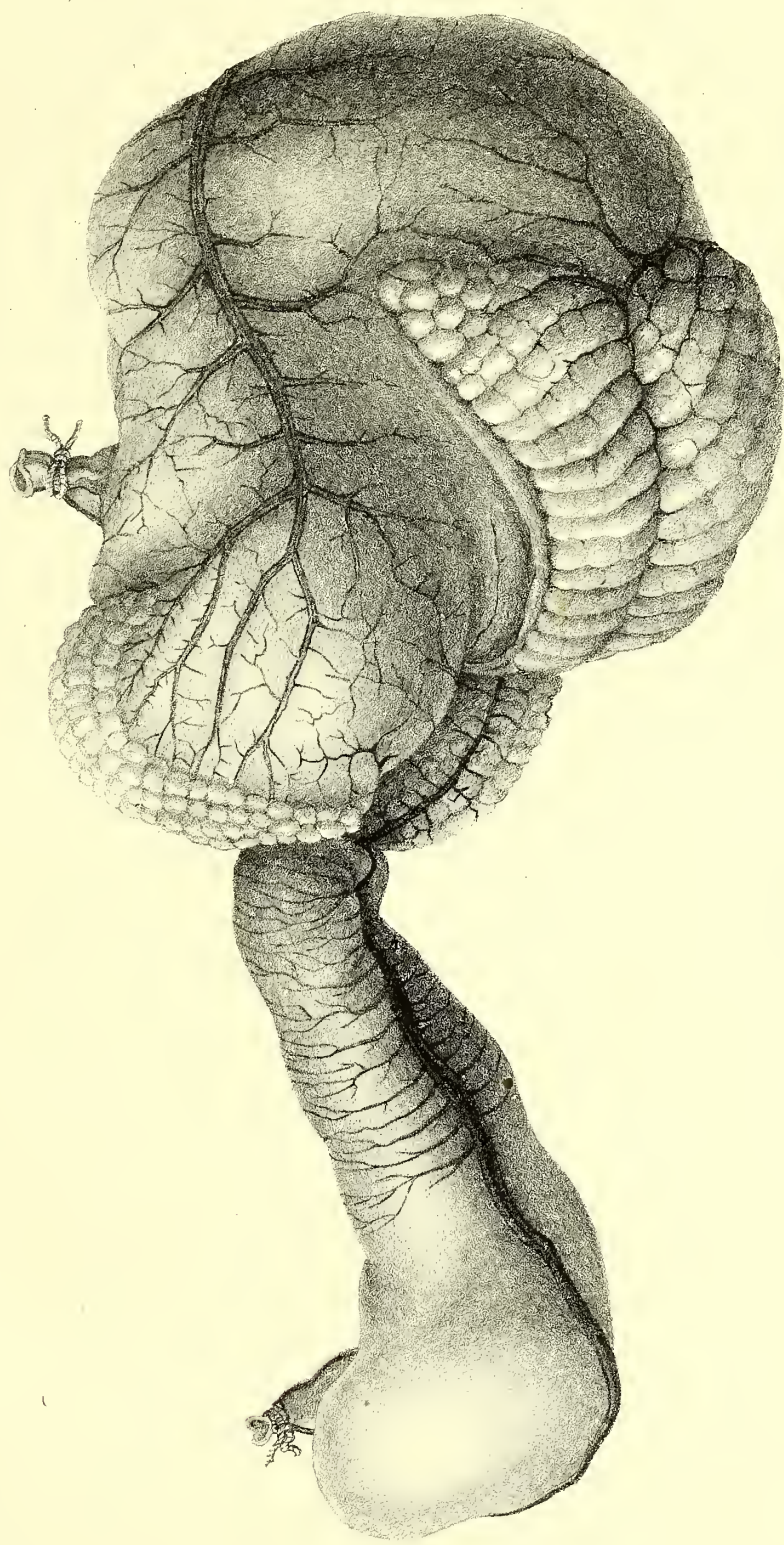
Represents an ANTERIOR VIEW of the external surface of the  
AL PACA'S STOMACH.

The engraving is upon the scale of two eighths of an inch  
to an inch.

The stomach is distended with air to show the forms of the different cavities as well as their size. The animal died a few days after its birth.

In this view, cells in miniature are seen through the coats of the stomach, but neither in depth nor width large enough to contain water in quantity sufficient to form a supply to be resorted to by the animal in desert places in which there is no water; and if we may judge from their size at this early period from the animal's birth, there is no reason to expect, that they will, when it has grown older, arrive at the size of those in the camel.

From this circumstance we must conclude, as well as from the hoof of this animal, which is divided, that it lives like the xariffa on the higher grounds, and not in the sandy desert like the camel, and feeds upon the succulent branches and leaves of trees, and therefore requires little, if any, water for the purpose of moistening its food.



Scale of 3. Inches



$\frac{1}{3}$  of an Inch to one Inch



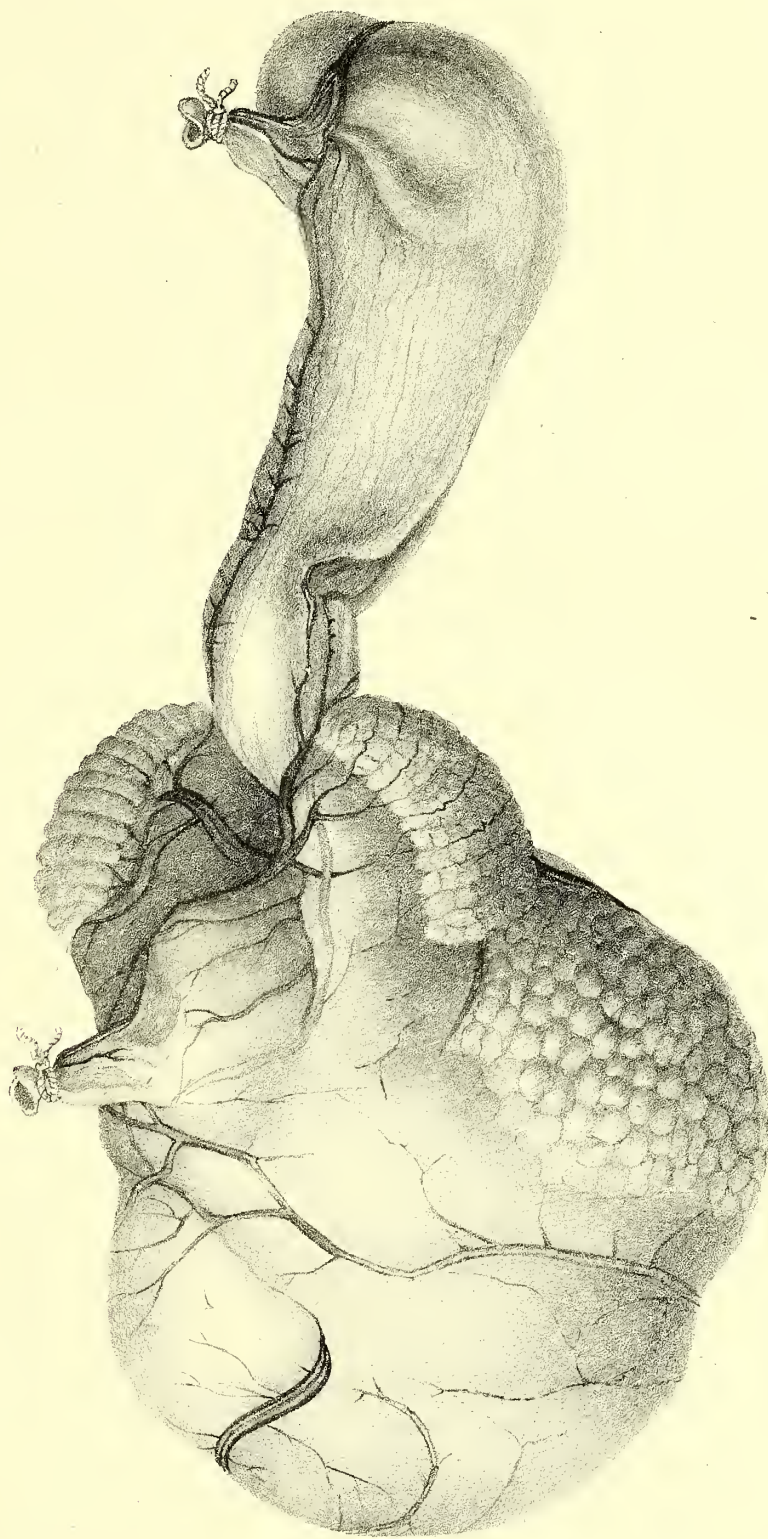
## PLATE IV.

A POSTERIOR VIEW of the STOMACH of the AL PACA, upon  
the same scale as the Anterior.

In this view of the stomach of the al paca, its opposite side is represented illustrating the fact that no part of it has any cells capable of containing a supply of water as in the camel.

The cellular structures, in this stomach, may be said to have the same form as those in the camel's first and second stomach.





Scale of 3 Inches.



$\frac{2}{3}$  of an Inch to one Inch.





## PLATE V.

URIC ACID crystallized on filaments of mucus; under which circumstances the crystals have sharp angles equally pointed with those of the triple phosphates, and therefore irritate in the same degree the parts they come in contact with.

Fig. 1. represents twenty-seven separate specimens of crystals of uric acid, showing great variety in their forms, magnified fifty times.

Fig. 2. represents uric acid crystallized upon ropes or filaments of mucus.

A, magnified ten diameters.

B, magnified fifty diameters.

Fig. 3. A calculus, voided from the bladder, magnified ten diameters.

These specimens prove that uric acid, when in the form of small crystals, is not rounded, but irregular on the external surface.

Fig. 1.

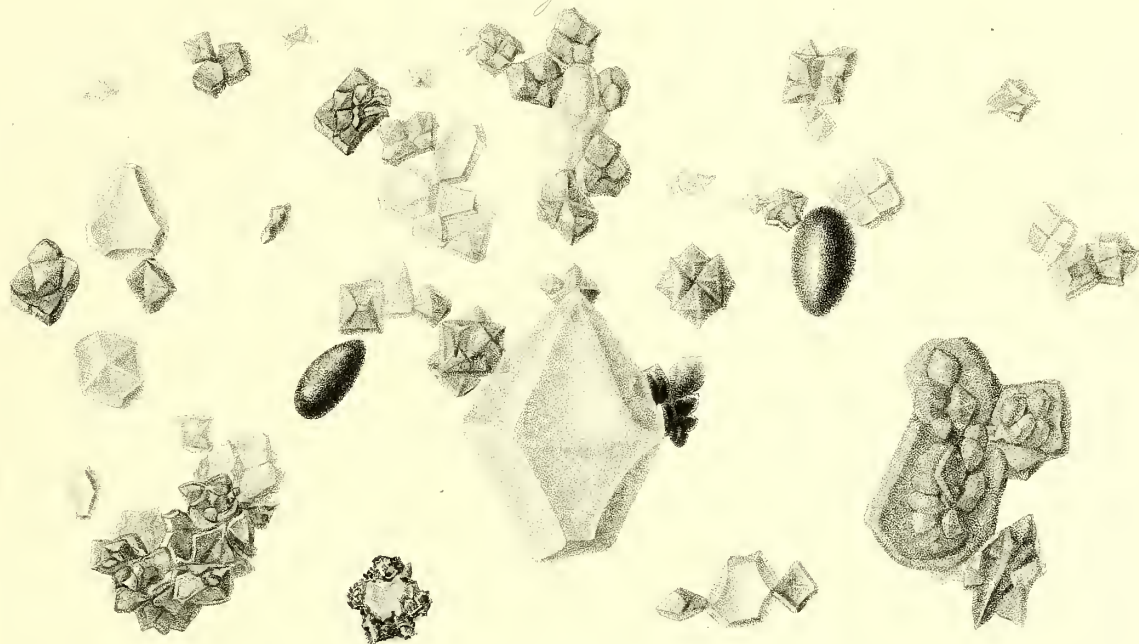


Fig. 2.



Fig. 3.





*Observations on the Elephant's Stomach.*

IN the second volume of this work, I have given, in Plate XVIII., the representation of a longitudinal section of the stomach of the elephant, which is preserved in the Hunterian collection: it was prepared in 1776, and I assisted in the examination. There is, at the cardiac extremity, a peculiarity of structure; the use for which it is intended I could not, at that time, form an idea of, nor have I, till the present moment, gained any information respecting it.

While Mr. Bauer was employed in making a drawing of the al paca's stomach, Mr. Pierard, a gentleman who resided many years in India, called upon him; and on seeing the drawing, and being told that the animals of that tribe had natural reservoirs for holding water, which in the al paca are very small, and formed the appearance that was then before him, Mr. Pierard immediately asked if I had examined the stomach of the elephant, which he was certain must have a reservoir for water connected with it; since, when the animal is tormented by insects while travelling in very hot weather, it has a power of throwing out from its proboscis, directly upon the part on which the flies fix themselves, a quantity of water, with such force as to dislodge them. The quantity of water thrown out is in proportion to the distance of the part attacked, commonly half a pint at a time; and this Mr. Pierard has known to be repeated eight or ten times within the hour. The quantity



of water at the animal's command for this purpose cannot therefore be less than six quarts.

This account of Mr. Pierard is confirmed by General Hardwick, who, in marching with a battering train in the Mysore country, had generally two of the strongest elephants attached to the guns he had charge of, and in the marches he made, had abundant opportunities of being an eye-witness to this mode of self-defence employed by the elephant, as well as to the other habits of that animal.

This water is not only ejected immediately after drinking, but six or eight hours afterwards.

Having received such well-authenticated accounts of this practice from eye-witnesses, although the fact is not known to several of my friends, who have resided many years in India, which probably arose from their never having been present when the elephant had been under the circumstances that required its being adopted, I am perfectly satisfied respecting it. Upon this information, I re-examined the preparation of the stomach itself, and found the structure, for which I must refer the reader to Plate XVIII. in the second volume of this work, perfectly well adapted to afford this occasional supply of water, which at other times will be employed in moistening dry food for the purposes of digestion.

I have since been present several times while the elephant in Exeter 'Change was in the act of drinking, which it does in the following manner: it dips its proboscis into the pail of water, and takes up a pint or more at a time; it then introduces the tip of the proboscis into the mouth, so as to pass it just beyond the epiglottis, and throws the

fluid with considerable noise down the œsophagus into the extremity of the cardiac portion of the stomach, forcing open the valvular structure, which is capable of resisting the solid food that goes gently down the œsophagus. The cardiac aperture of the stomach is wide, and is so near to the outermost of the septa or valves, that fluids will pass into the space beyond, and the water can by suction be again regurgitated into the œsophagus, and from thence into the proboscis.

The quantity of water drank at any one time is three or four gallons.

It is in this accidental way that the uses of parts only occasionally resorted to are often discovered; only one or two individuals having taken advantage of their opportunities of paying attention to them.





## PLATE VI.

CALCULI, to show their Internal Structure, and the difference  
of texture in different parts of their substance.

Fig. 1. consists of nine different specimens.

A, a calculus extracted by the high operation at St. George's Hospital, by the author. Natural size.

B, a portion of the surface of the same, magnified six diameters.

C, a cluster of crystals magnified fifty diameters, and six smaller clusters magnified in the same degree, to show the irregularity of their surface.

Fig. 2. consists of a portion of a calculus, and clusters of small crystals.

A, a small portion of the outer layer of a calculus, extracted from the bladder of a man at St. George's Hospital, by the high operation for the stone, by the author, which, although entire after it was extracted, was so loose in its texture that it fell to pieces in the hands of a gentleman while examining it ; magnified six diameters.

B, eight fragments from the external layer of the same calculus, magnified fifty diameters.

C, minute crystals of triple phosphates interspersed through the different layers of the calculus, magnified fifty diameters.

Fig. 3. consists of twelve specimens.

No. 1. A calculus from the kidney, magnified six diameters.

A, crystals from the interior of the above calculus, three in number.

B, eight more of these fragments, which are all magnified fifty diameters.

Fig. 1.

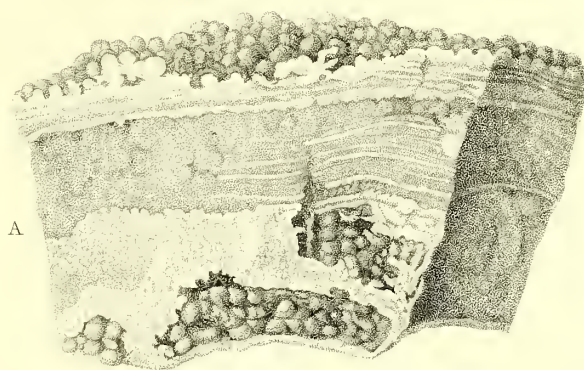
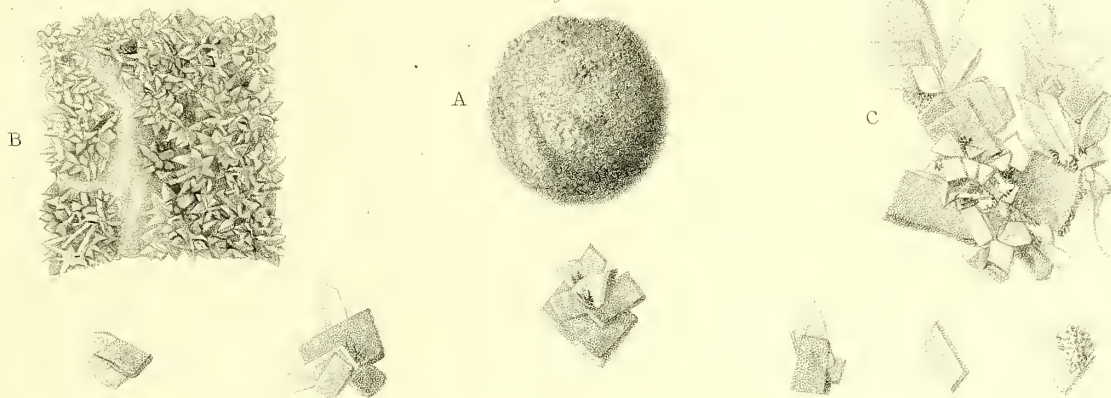


Fig. 2.

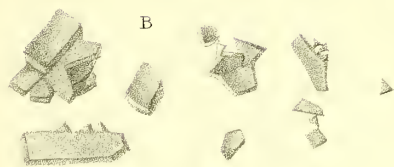


Fig. 3.





## PLATE VII.

AN ANEURISMAL SAC IN THE EXTERNAL ILIAC ARTERY.

ITS EXTERNAL APPEARANCE.

Fig. 1. represents a small portion of the aorta, the division into the two iliacs, and their subdivision into the external and internal iliac branches.

The course of the external of these branches traced to the opening into the aneurismal sac.

The upper part of the femoral artery slit open from the lower orifice in the aneurismal sac to the part where its canal had become obliterated by the ligature applied in the operation performed upon it.

Fig. 2. The lower part of the aorta, and the common iliac trunk slit open, to show an ossification in its internal membrane.

Both figures are of the natural size.



Fig. 1.

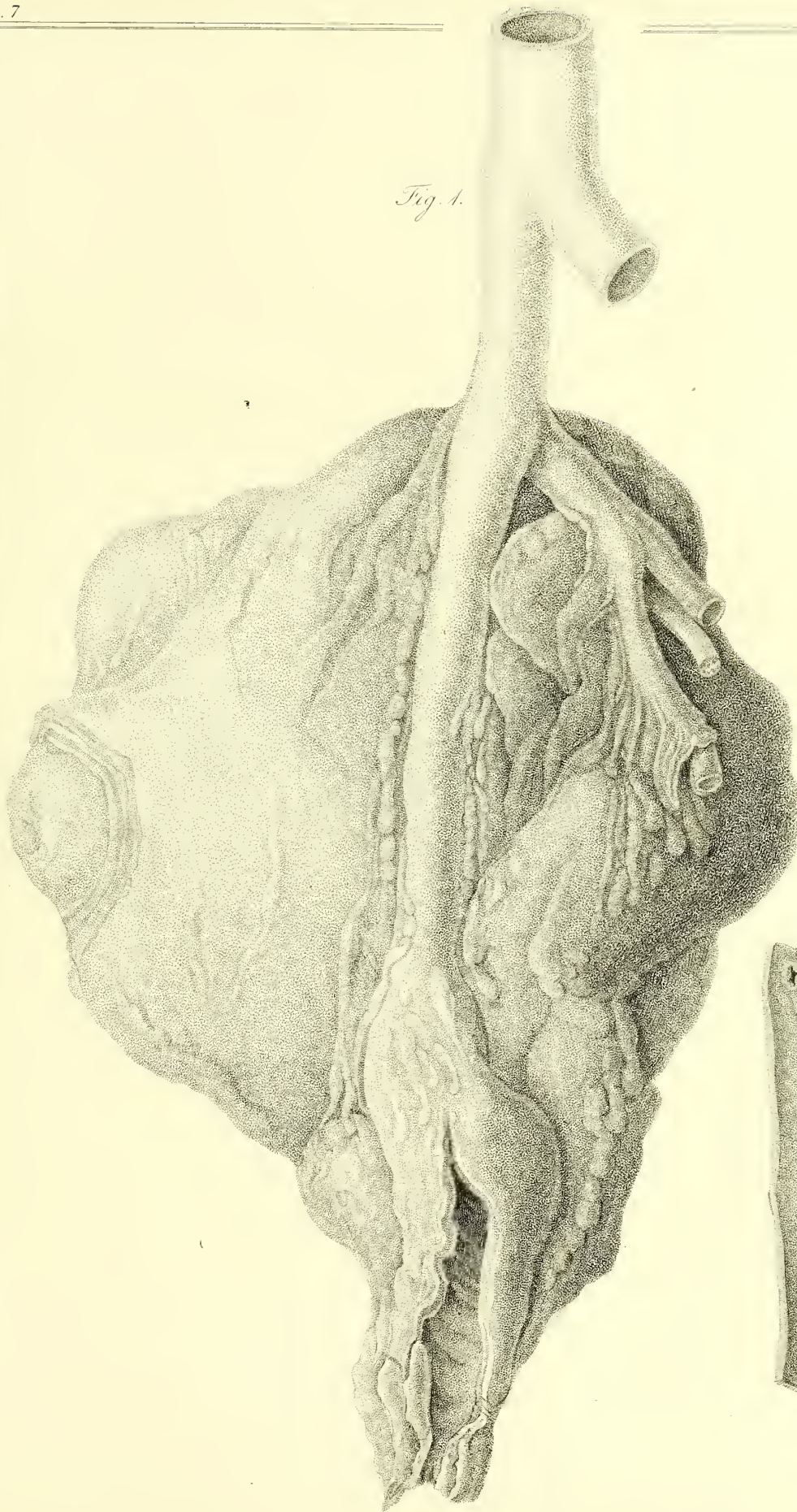
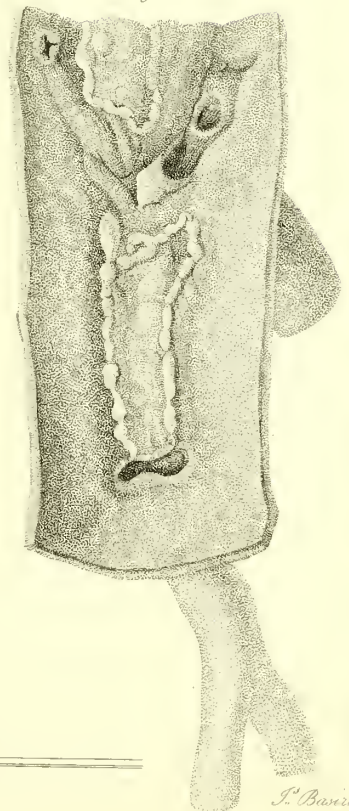


Fig. 2.







## PLATE VIII.

AN INTERNAL VIEW of the same ANEURISMAL SAC, after the blood contained in it had been coagulated by means of a heated wire plunged into the fluid blood during life.

Fig. 1. represents a portion of the aorta, and of the trunk of the iliac artery passing on the outside behind the aneurismal sac.

The sac itself laid open, and the laminæ of coagulated blood contained in it exposed. Near the lower part of the sac there is the communication between the sac and the artery.

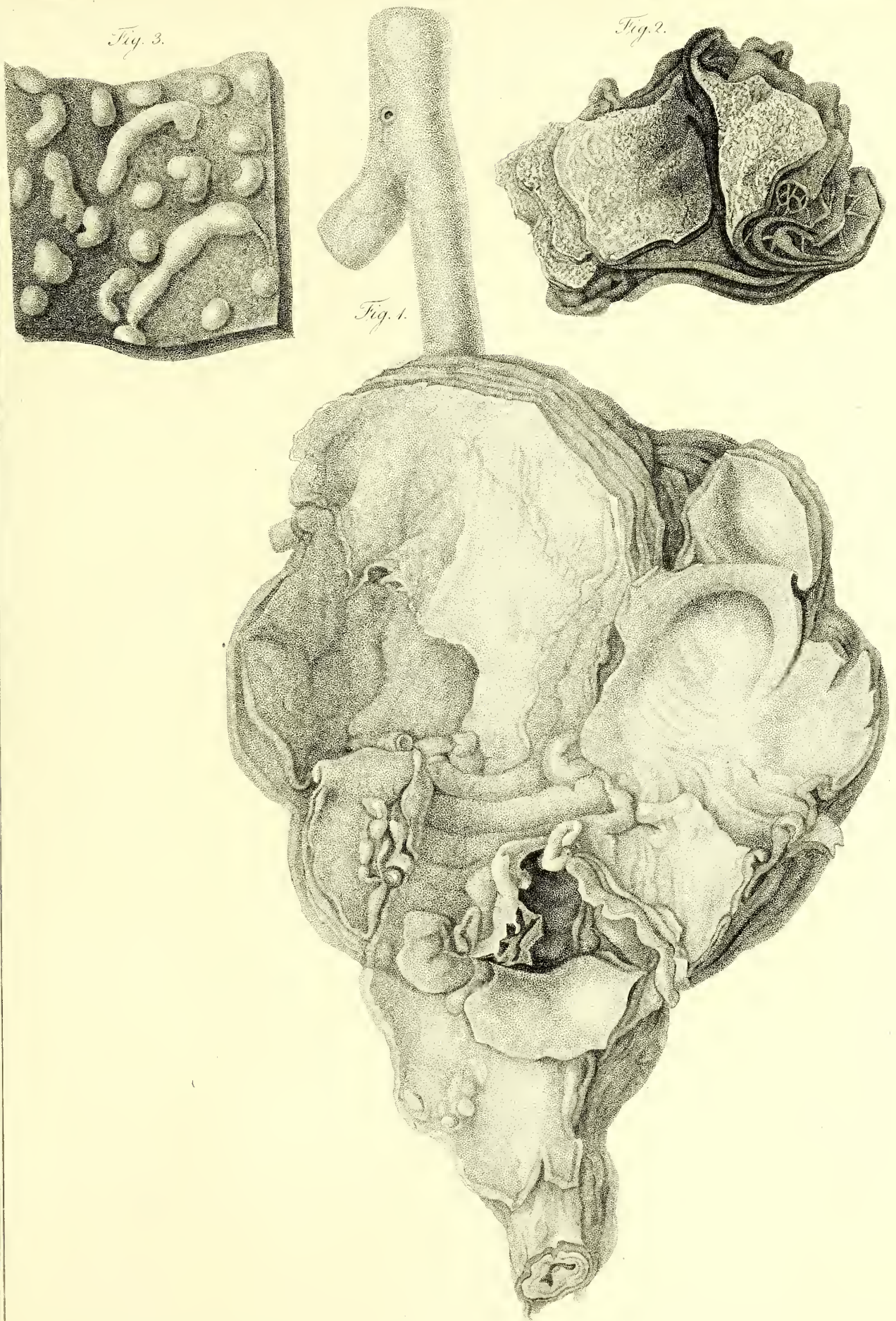
The tumour is seen to adhere to the external iliac artery, and also to the common trunk above the division.

Fig. 2. represents a small portion of the coagulum formed by the heated needle in the operation that had been performed ; its structure is foliated ; the laminæ thin, compact, and connected together by thread-like filaments.

Both figures of the natural size.

Fig. 3. shows one of these laminæ magnified ten diameters. The solid bodies on its surface consist of coagulable lymph, in which there are no red globules.







## PLATE IX.

The remains of the TUMOUR in a POPLITEAL ANEURISM, after the operation of tying the femoral artery for the cure of that disease had been successfully performed.

Fig. 1. shows the femoral artery, in which the canal is obliterated from the going off of the profunda to the part where the ligature was applied, and at that part an ossification had taken place : the femoral vein is seen in a natural state.

Fig. 2. represents the remains of the aneurismal sac forming a solid tumour : the man died twenty months after the femoral artery had been tied of a fever.

There is a large anastomosing branch from the arteria profunda, joining the popliteal artery where it divides into the two tibial arteries.

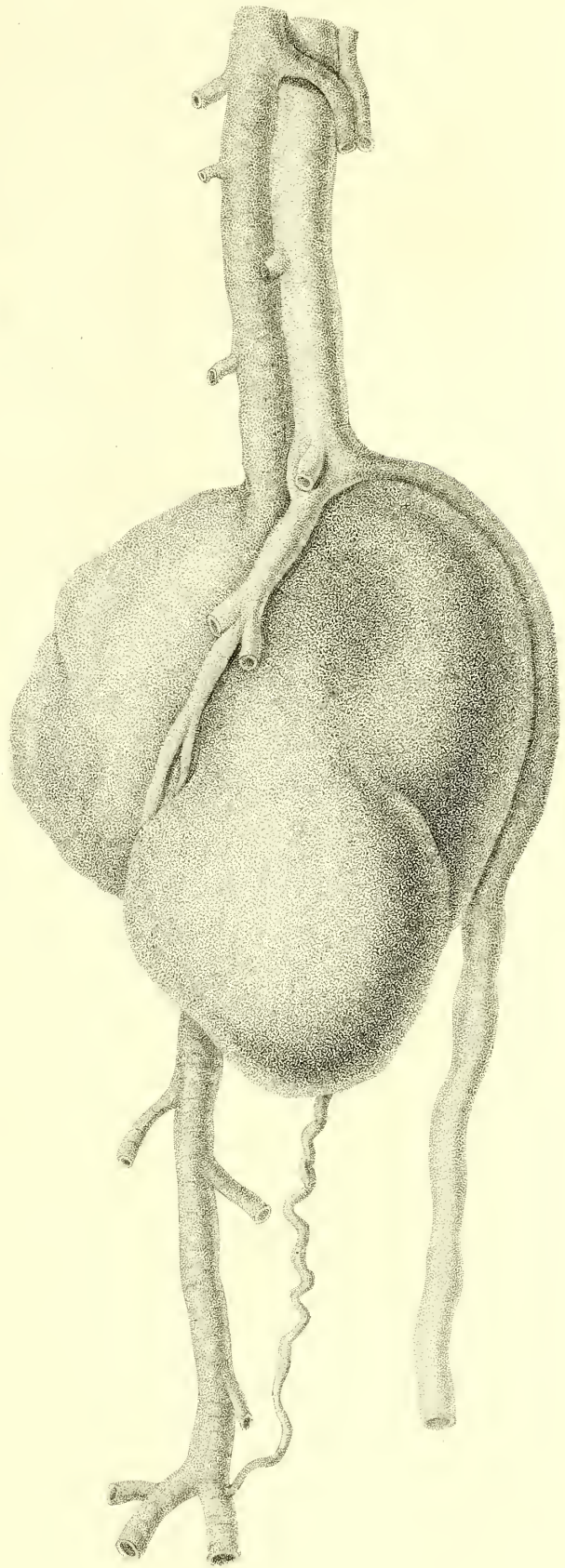
Both figures are of the natural size.



Fig. 1.



Fig. 2.





## PLATE X.

Shows that the CUPPED APPEARANCE of BLOOD is produced by the contraction of the blood-globules, not of those of the coagulable lymph.

Fig. 1. represents buffy blood, in which the surface was quite flat : its being a little cupped arises from immersion in proof spirit to prevent its dissolution.

Fig. 2. A perpendicular section of the same coagulum.

Both figures of the natural size.

Fig. 3. A small portion of the upper part of fig. 1. magnified 200 diameters, to show that it is composed of lymph-globules from  $\frac{1}{2000}$  to  $\frac{1}{3200}$  parts of an inch in diameter.

Fig. 4. Globules from the lower portion of fig. 2. magnified 200 diameters, to show that they are blood globules from  $\frac{1}{2000}$  to  $\frac{1}{3200}$  parts of an inch in diameter.

Fig. 5. A coagulum of blood taken from the arm of a person labouring under inflammation of the lungs.

Fig. 6. A perpendicular section of fig. 5.

Both figures of the natural size.



Fig. 1.

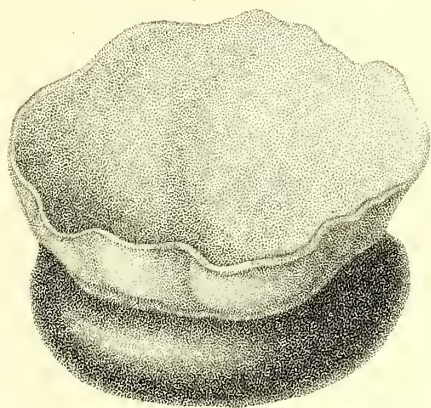


Fig. 2.

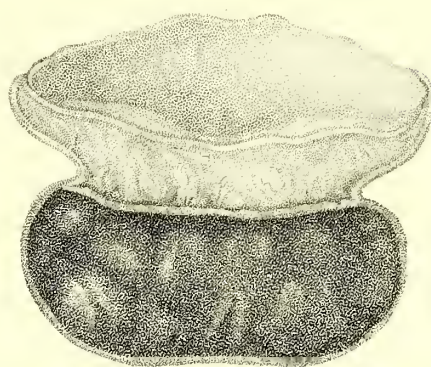
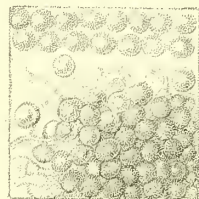
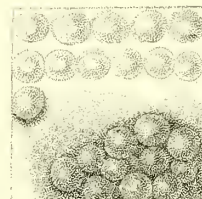


Fig. 3.



From 2800 to 3200  
parts of an inch.

Fig. 4.



From 2000 to 2400  
parts of an inch.

Fig. 5.

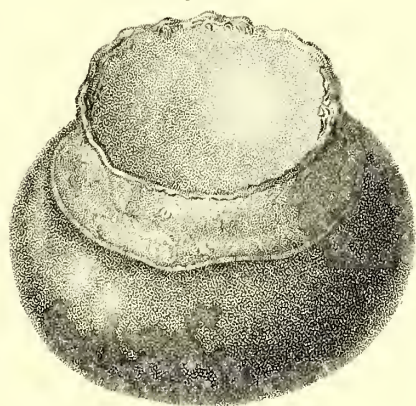
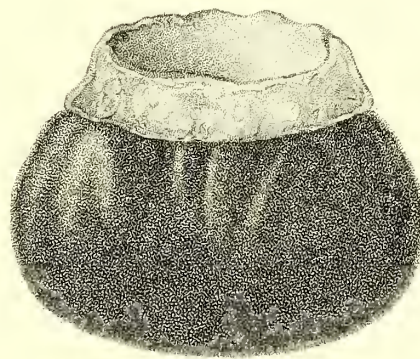


Fig. 6.





## PLATE XI.

Shows the CELLS of the HUMAN LUNGS, magnified in different degrees.

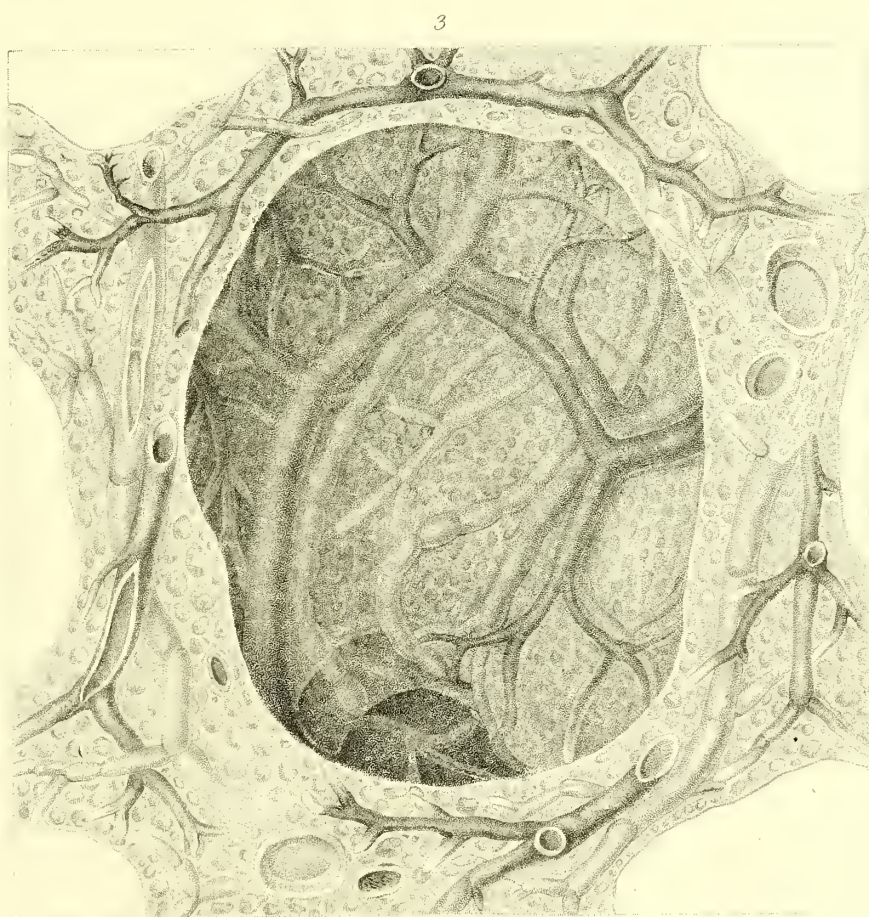
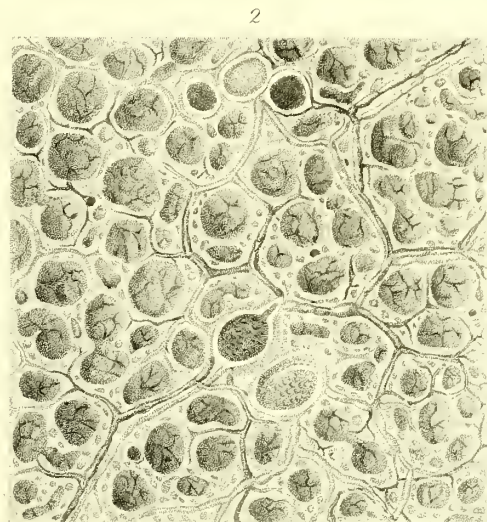
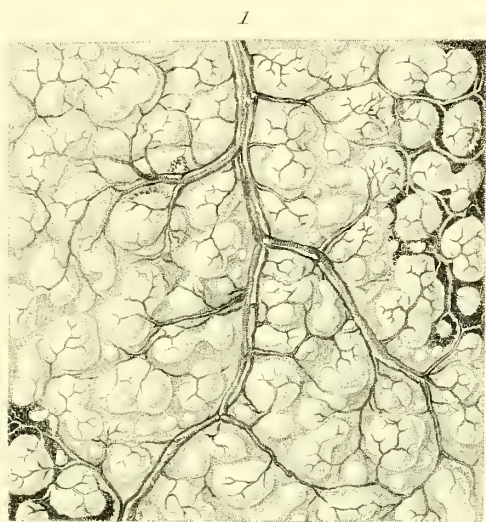
One cell is highly magnified to expose its minute structure, which has never before been so accurately represented.



Fig. 1. represents  $\frac{1}{64}$  part of an inch of the external surface of the human lungs, the cells of which are filled with mercury, magnified twenty diameters.

Fig. 2. A transverse section of the same extent, in which the arteries are filled with red, the veins with yellow injection, magnified in the same degree.

Fig. 3. A single cell and the parts immediately surrounding it, magnified 400 diameters. In this figure it is seen that there are absorbents leading from the cells of the lungs to the pulmonary veins, for the purpose of supplying the left ventricle of the heart with oxygen, taken in from the atmosphere.





## PLATE XII.

The STRUCTURE of the HUMAN LUNGS immediately surrounding the air-cells separately examined.

Fig. 1. The substance intermediate between the cells in the human lungs in a recent state, consisting of small cells, every where communicating with the large cell and with one another, the arteries and veins injected.

Fig. 2. A portion of a terminal branch of the pulmonary artery, beyond the reach of the injection, distended with gas close to the cell.

Fig. 3. A portion of another terminal branch, in which the force employed had produced extravasation through the ends of the arteries.

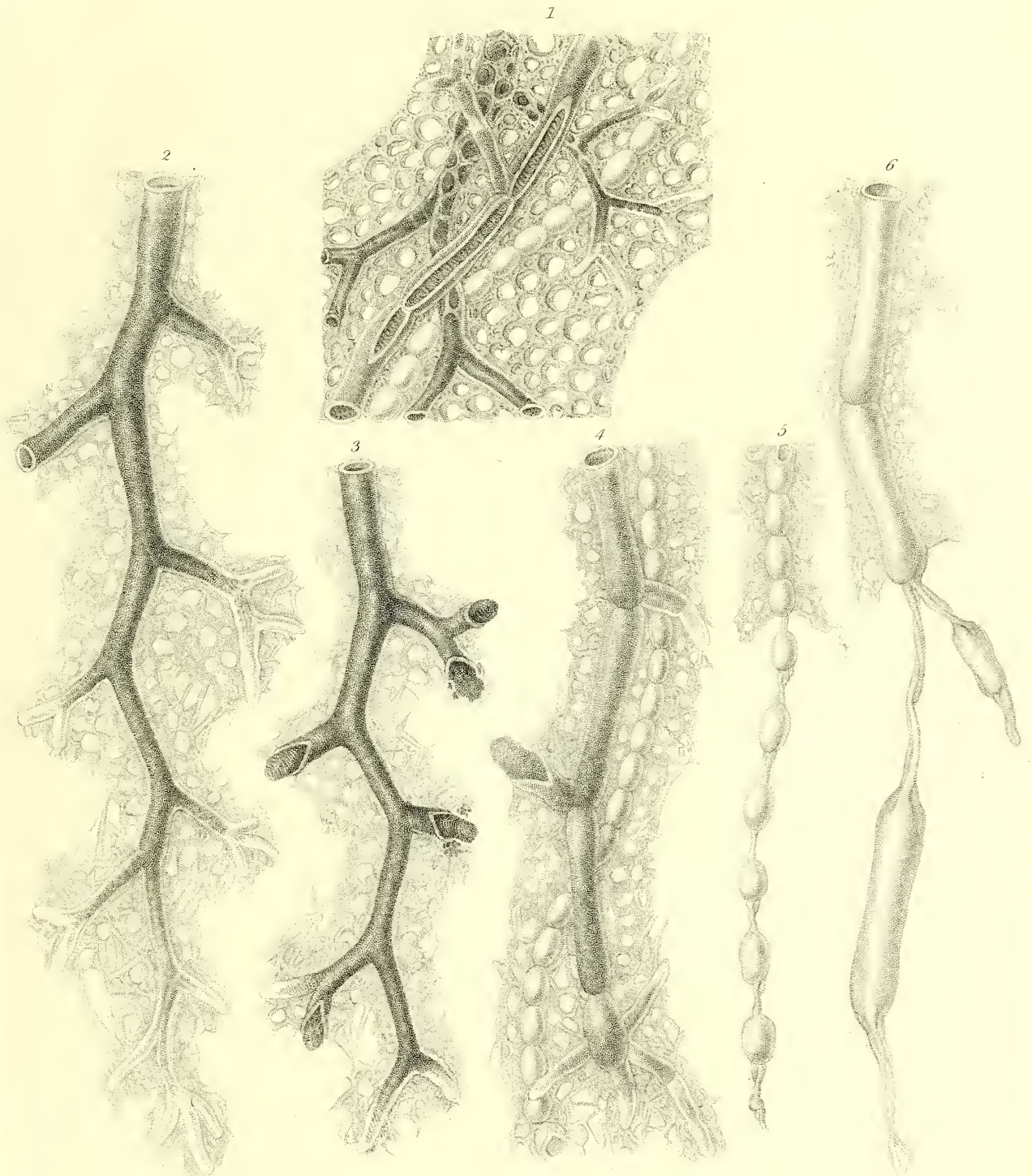
Fig. 4. A portion of an injected vein accompanied by an absorbent vessel; the injection from the vein has been extravasated.

Fig. 5. A portion of an absorbent vessel in a dried state, some portions distended with gas, others collapsed.

Fig. 6. A portion of a pulmonary vein dried, partly filled with gas.

All these figures are magnified 400 diameters.









## PLATE XIII.

Shows that the AIR-CELLS of the LUNGS of a HARE that has been coursed, are filled with an exudation of coagulable lymph, forming tubercles like those that take place in the disease commonly called consumption.

Fig. 1. The external surface of the lungs of a hare that had been coursed, showing that the superficial air-cells, under those circumstances, are filled with coagulable lymph.

Fig. 2. A section of the lungs in which it is seen that the deeper-seated air-cells are smaller than the superficial, and are filled with blood.

Fig. 3. A longitudinal section of the same lung, to show the depth of the superficial air-cells.

Fig. 4. The superficial cells that had not received the lymph injected with mercury.

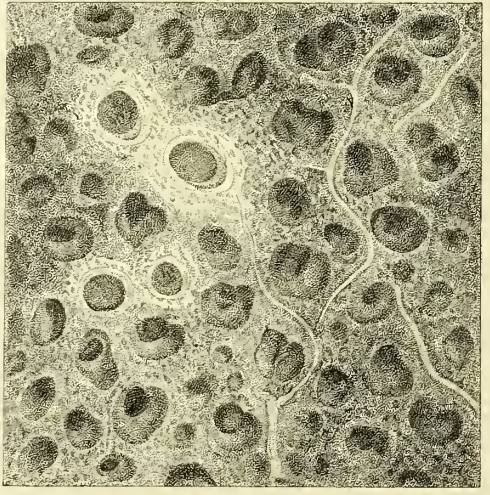
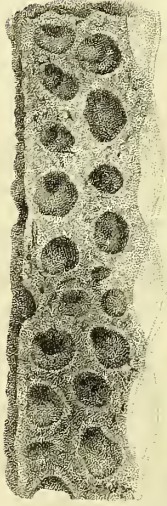
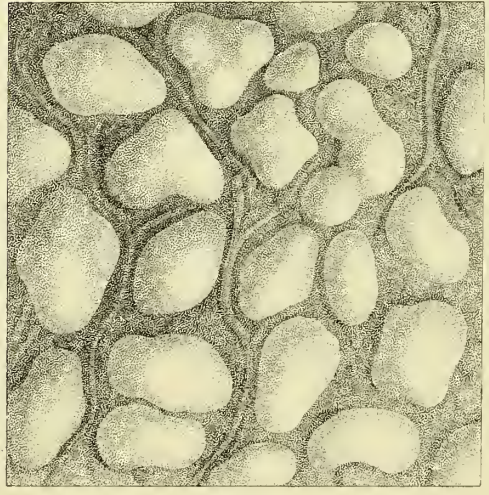
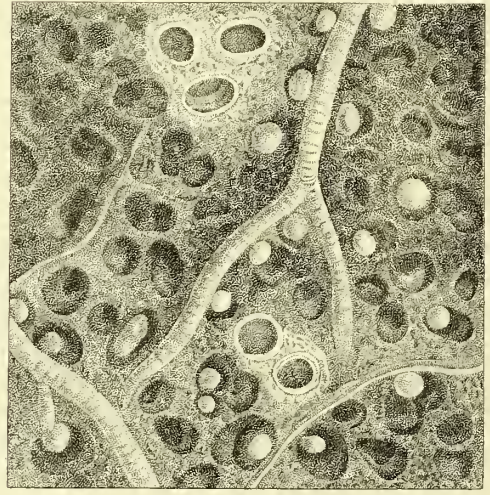
Fig. 5. The deeper-seated cells injected with mercury.

Fig. 6. A portion of the terminating branch of a bronchial tube laid bare in the hare.

Fig. 7. A bronchial tube in the sheep, exposed in the same way.

These seven figures are magnified twenty diameters.







## PLATE XIV.

Shows the internal structure of the LUNGS of the TURTLE, in which there are no cells, but an open trellis-work on each side of the canal of the trachea.

Fig. 1. A longitudinal section of one of the branches of the bronchiæ, the terminations of which are not in cells, but in a kind of trellis-work, supported by means of cartilaginous bands.

Where these bands are cut through, they are found only to be cartilaginous in the centre, the surrounding substance being of a more pliant nature : wherever these cartilages have been cut across, the cut surface afterwards becomes of a bright red colour, although it had no such appearance when the parts were first divided, so that the colour is acquired from exposure to the air of the atmosphere.

The parts are magnified three times.

Fig. 2. A small portion of the trellis-like structure, magnified ten times.





*P. lutea* del.



*P. lutea* sculp.



## PLATE XV.

Shows the more minute internal structure of the HUMAN BRAIN. The brain of the TENCH, HUMBLE BEE, and GARDEN-SNAIL, is also represented.

Fig. 1. A portion of the cerebrum of the human brain, magnified five diameters.

Fig. 2. A smaller portion, magnified twenty-five diameters.

Fig. 3. A still smaller portion magnified 200 diameters.

Fig. 4. The upper surface of a tench's brain.

Fig. 5. The under surface of the same brain.

Fig. 6. A horizontal section.

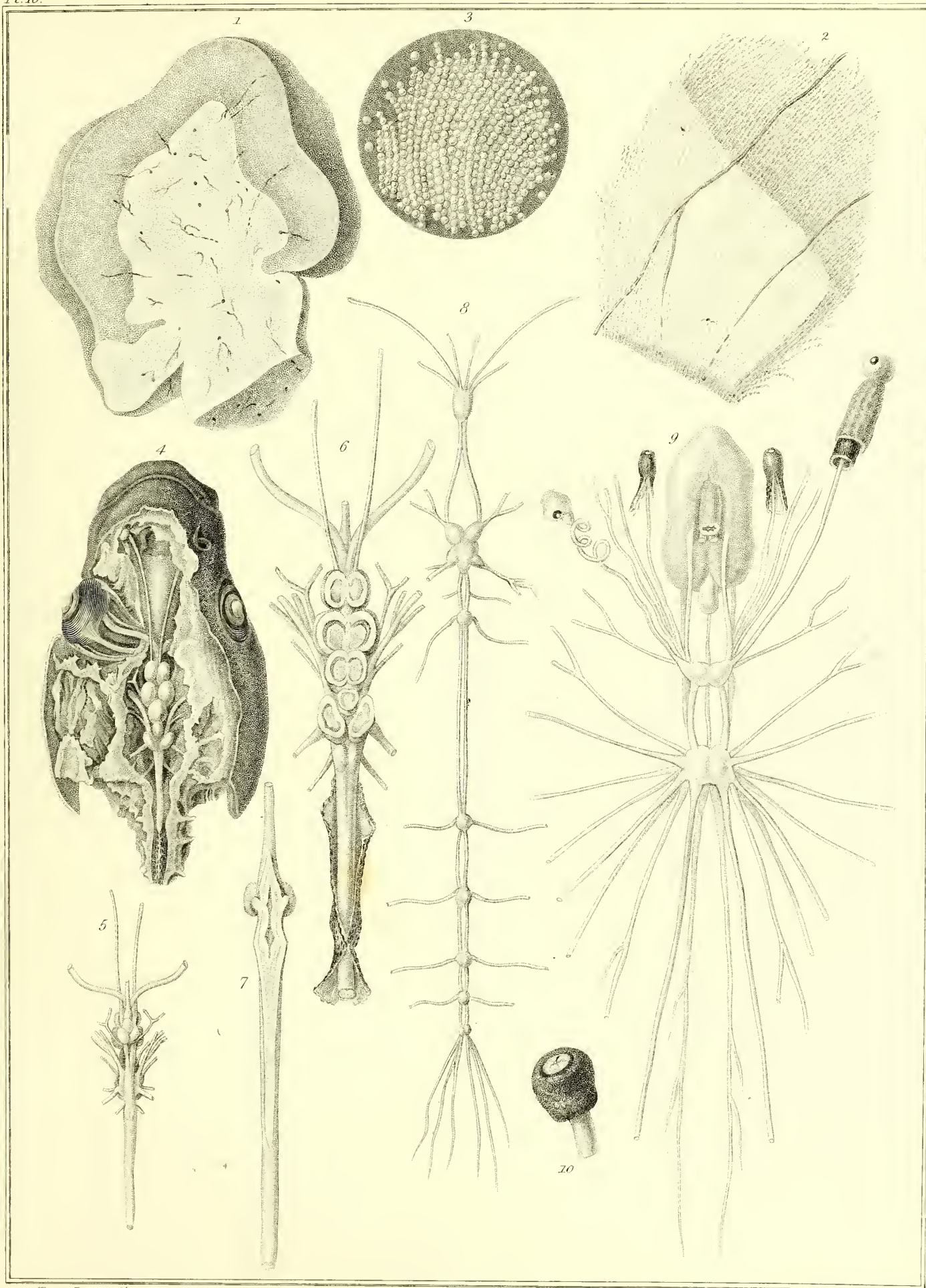
Fig. 7. The internal cavity : all of the natural size.

Fig. 8. The brain of a humble bee magnified ten diameters, showing the brain, the substitute for spinal marrow, the ganglions, and nerves.

Fig. 9. The brain of the garden-snail magnified four diameters, to show the brain and substitute for the spinal marrow : there are nerves but no ganglions. There are no eyes, although the horns terminate in a structure generally mistaken for them.

Fig. 10. The end of the horn magnified fifty diameters, to show that its structure is composed of nerves, but that there is no organ of vision.









## PLATE XVI.

Represents the BRAIN, SPINAL MARROW, GANGLIONS, and  
NERVES, of the MOTH, the SILK-WORM, CATERPILLAR,  
LOBSTER, and EARTH-WORM.

Fig. 1. The brain, spinal marrow, ganglions, and nerves of the moth of the silk-worm, magnified ten diameters.

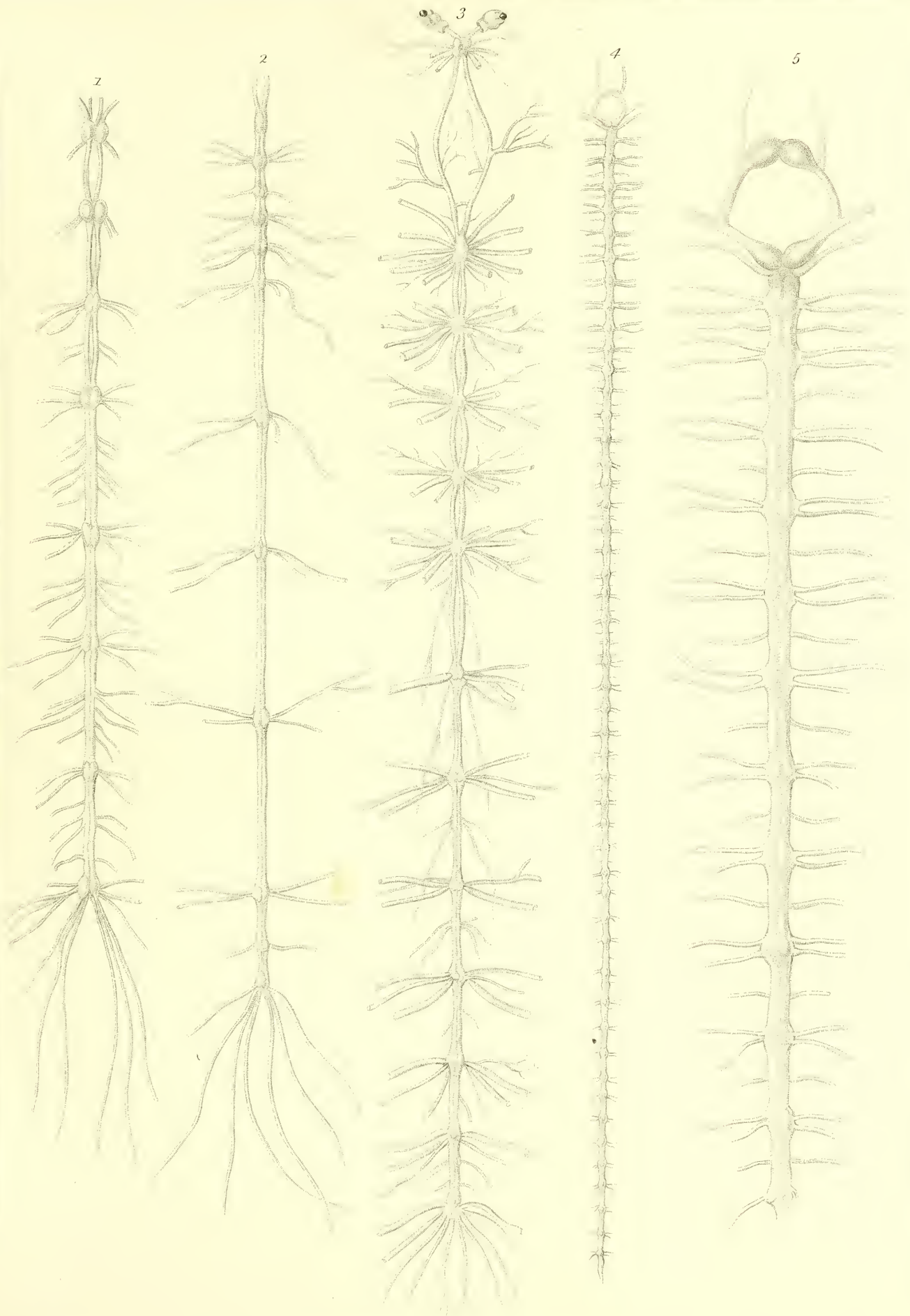
Fig. 2. The same parts in a large caterpillar, magnified four diameters.

Fig. 3. The same parts of the lobster, natural size.

Fig. 4. The same parts in the earth-worm, magnified two diameters.

Fig. 5. The same parts in the earth-worm, magnified eight diameters.

From these representations it appears, that the ganglions are, in their structure and appearance, different from that of the brain and spinal marrow, however near the resemblance.





## PLATE XVII.

Shows that the HUMAN BRAIN has its structure destroyed by FREEZING : the representations are magnified in different degrees, to show how completely the decomposition has taken place.

The cicatrix, or tread of the cock, as it is termed, in the egg, is equally decomposed by freezing.

Fig. 1. A portion of the human cerebrum, including both the cortical and medullary substance, after having been completely frozen and then thawed, is here represented, the water produced in this process having been allowed to drain off, magnified five diameters.

Fig. 2. A portion of the above magnified twenty-five diameters : globules of gas are here let loose.

Fig. 3. A small part, magnified 200 diameters.

If these three figures are compared with those in Plate XIV., with which in shape and size they correspond, the change in the structure of the brain will be better understood.

Fig. 4. The molecule of the pullet's egg is represented, after it had been frozen and allowed gradually to thaw, showing that its structure is equally decomposed with that of the human brain.



Fig. 1.

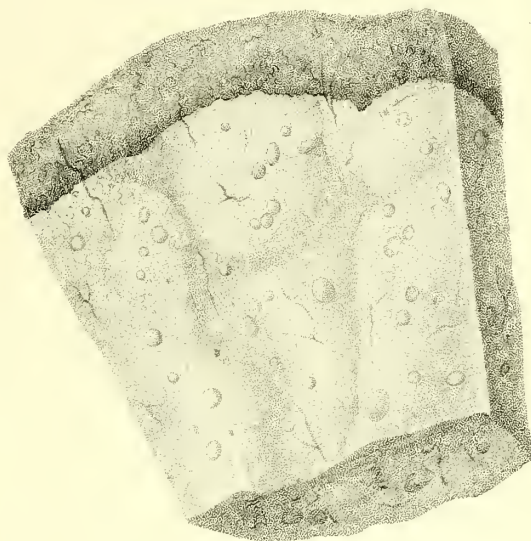


Fig. 2.

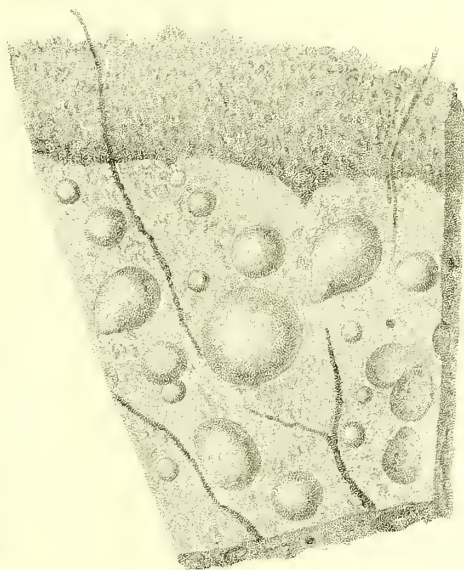


Fig. 3.

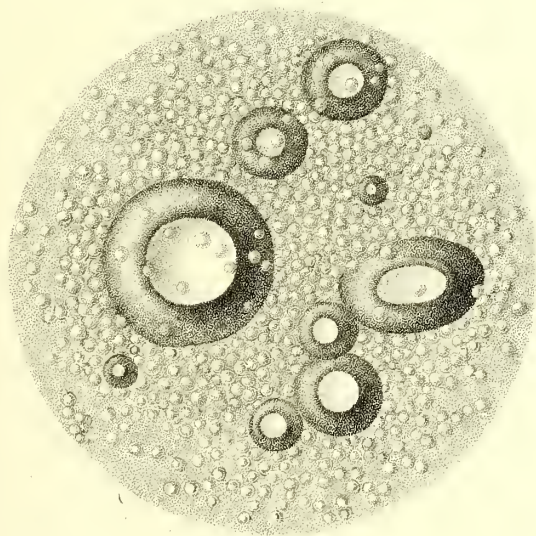
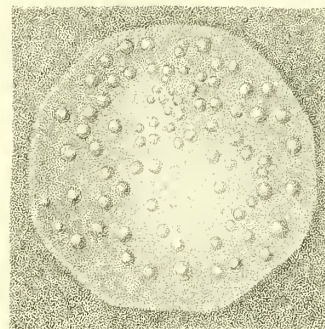


Fig. 4.





## PLATE XVIII.

The **SPLANCHNIC GANGLION** in the human body represented, in which its internal parts are highly magnified to show its structure, which has not, I believe, been before so minutely examined.

Fig. 1. The splanchnic ganglion, in situ, natural size.

Fig. 2. The same in its dura matral covering, magnified two diameters.

Fig. 3. A longitudinal section, magnified two diameters.

Fig. 4. A small portion seen through the pia matral covering, magnified six diameters.

Fig. 5. A longitudinal section of fig. 4.

Fig. 6. A portion of the substance of the ganglion, magnified twenty diameters.

Fig. 7. A single fibre in its contracted state, the globules  $\frac{1}{100}$  part of an inch.

Fig. 8. The same extended to more than double the length of fig. 7., by means of the elasticity of the gelatinous medium in which the globular fibres are imbedded.



Fig. 2.



Fig. 1.

Natural size

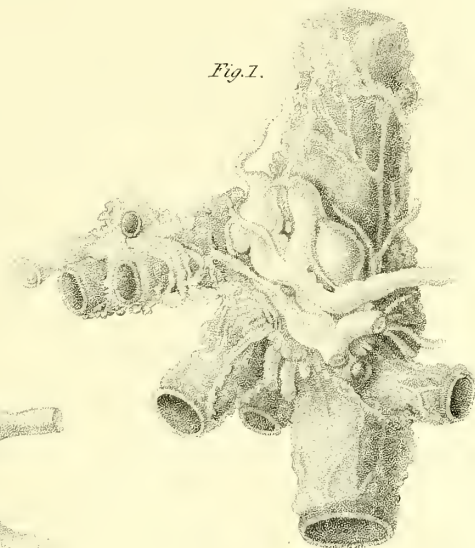


Fig. 3

x. 2.



Fig. 6



Fig. 4.



Fig. 5

x. 6.



Fig. 8.



Fig. 7.







## PLATE XIX.

This plate exhibits the NERVES of the FUNDUS of the UTERUS in a woman twenty-two years of age, who died six days after delivery.

The plate exactly copied from Tiedman's German work, in which the different nerves are traced with the greatest accuracy.

This figure shows the nerves of the uterus, the body of that organ being bent forwards.

The infinite number of ganglions which are met with in the nerves of this organ confirm the opinion I have advanced of ganglions being requisite for the production and support of animal heat ; and their increase in size during uterogestation, in which period the heat of the organ is increased in so wonderful a degree, made me desirous of adopting this plate, which was originally made by an anatomist who had no theory upon the subject, and therefore could not be led to add to or diminish the objects placed before him.















## PLATE XX.

An outline of Plate XIX., with figures of reference to all  
the parts shown in that Plate.

*Explanation of the Figures of Reference.*

1, 1, 1. Small branches cut off from the inferior splanchnic nerve of the right side, which descend to the anterior renal ganglion.

2. The anterior renal ganglion.

3, 3, 3. Nervous branches emerging from the ganglion, and surrounding the renal artery.

4. Shoots going from the renal ganglion to the spermatic plexus, or that of the ovarium.

5. The spermatic plexus surrounding the trunk of the artery going to the ovarium.

6. Nervous branches cut off from the artery of the right ovarium.

7, 7, 7, 7. Small branches of nerves, which pass along with the artery of the ovarium, between the laminæ of the broad ligament to the right ovarium and Fallopian tube.

8. A branch which runs from the renal ganglions to the inferior mesenteric plexus and uterus.

9, 9. A small branch which connects the lowest thoracic ganglion to the first lumbar.

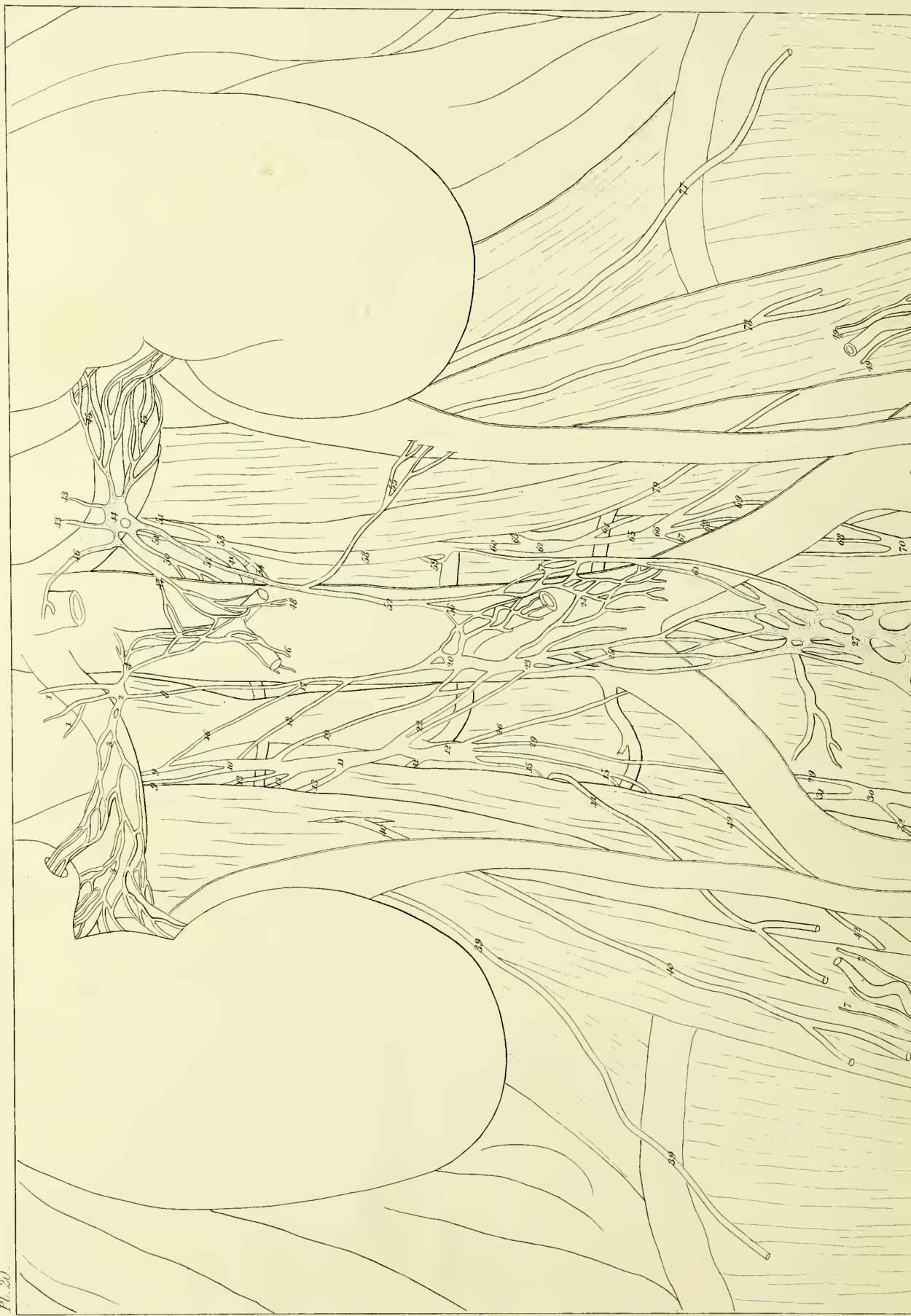
10. The first lumbar ganglion.

11. The second lumbar ganglion.

12. The third lumbar ganglion.

13, 13, 13. Shoots from the first fasciculus of the first lumbar, which enter the second lumbar ganglion.











14. The root which the second lumbar nerve sends to the third ganglion.

15, 15. The anastomosing branches between the third lumbar nerve and the third lumbar ganglion.

16. A nervous filament from the small branch that joins the lowest thoracic ganglion to the inferior mesenteric plexus.

17. The junction of the above filament with the shoot from the anterior renal ganglion.

18. A shoot from the first lumbar ganglion descending to the inferior mesenteric plexus.

19. A shoot from the same ganglion passing to the mesenteric plexus.

20. A ganglion on the side of the aorta.

21. Nervous filaments, which with those of the opposite side, form the inferior mesenteric plexus.

22. Shoots from the second lumbar ganglion, that go to the uterine plexus.

23. Ganglionic mass.

24. Filaments which surround the aorta and the iliac arteries.

25. Branches passing beyond the iliac arteries to the uterine plexus.

26, 26. A shoot from the third lumbar ganglion, passing behind the right iliac artery to the common uterine plexus.

27. The common uterine plexus.

28. Small branches from the common uterine plexus descending into the pelvis.

29, 29. Anastomoses between the third and fourth lumbar ganglions.

30. The fourth lumbar ganglion.
31. The communicating root between the fourth lumbar nerve and fourth lumbar ganglion.
32. The nervous shoot that connects the fourth lumbar ganglion with the hypogastric artery.
33. The fifth lumbar ganglion uniting with the first sacral.
34. Small branches going to the superior right uterine plexus.
35. Anastomoses between the first and second sacral ganglion.
36. The right superior uterine plexus.
- 37, 37, 37, 37, 37. Nervous shoots, accompanying small arteries, passing to the posterior surface of the uterus.
38. Small branches from the same plexus going to the anterior surface of the uterus.
39. Cutaneous branches of the first lumbar nerve.
40. The same of second lumbar nerve.
41. The same of third lumbar nerve.
42. The same of fourth lumbar nerve.
43. Roots dissected from the lesser splanchnic nerve of the left side.
44. Anterior renal ganglion.
45. Nerves rising from the ganglion, which adhere to the renal arteries, and with them enter the kidneys.
46. A branch going to the mesenteric artery.
47. Branches, which, with those of the opposite side, form the spermatic or ovarian plexus.
48. Branches cut off from the plexus of the left ovarium.
- 49, 49, 49, 49. Shoots which confine the left spermatic artery, and descend between the laminae of the broad ligament, to the left ovarium and Fallopian tube.

50. Shoots sent by the renal ganglion to the aorta.
- 51, 51. Branches that join the lower thoracic ganglion to the first lumbar.
- 52, 52. A small branch that joins the renal ganglion to the inferior mesentery and uterine plexus.
53. The first lumbar ganglion of the left side.
54. A shoot from the same ganglion joined to the branch, No. 52.
55. The nerves of the ureters.
56. A branch sent to the inferior mesenteric plexus.
57. Branches that pass between the inferior mesenteric plexus and uterine plexus.
58. Second lumbar ganglion.
59. Branch communicating between this ganglion and the third lumbar nerve.
60. Branch going from the ganglion to the uterine plexus.
61. Nervous filaments crossing the left iliac artery, to come at the uterine plexus.
62. Third lumbar ganglion.
63. The root of this ganglion anastomosing with the third lumbar nerve.
64. A branch anastomosing with the fourth lumbar nerve.
65. Anastomosis between the third and fourth lumbar ganglions.
66. The fourth lumbar ganglion.
67. A branch descending behind the iliac artery, which this ganglion sends to the uterine plexus.
- 68, 68. Anastomosing branches between the fourth and fifth lumbar ganglions.
69. A shoot cut off, which the fourth lumbar ganglion sends to the ureter.



70. Fifth lumbar ganglion.

71. First sacral ganglion.

72, 72. Branches from this ganglion to the left superior uterine plexus.

73. A fasciculus of nervous filaments which arises from the great common uterine plexus.

74. The left superior uterine plexus.

75, 75, 75, 75, 75, 75, 75. Nervous filaments upon the posterior surface of the uterus, which enter the substance along with the uterine arteries.

76. Branches going to the inferior uterine plexus.

77. Cutaneous branches of the first lumbar nerve.

78. ————— second lumbar nerve.

79. ————— third lumbar nerve.

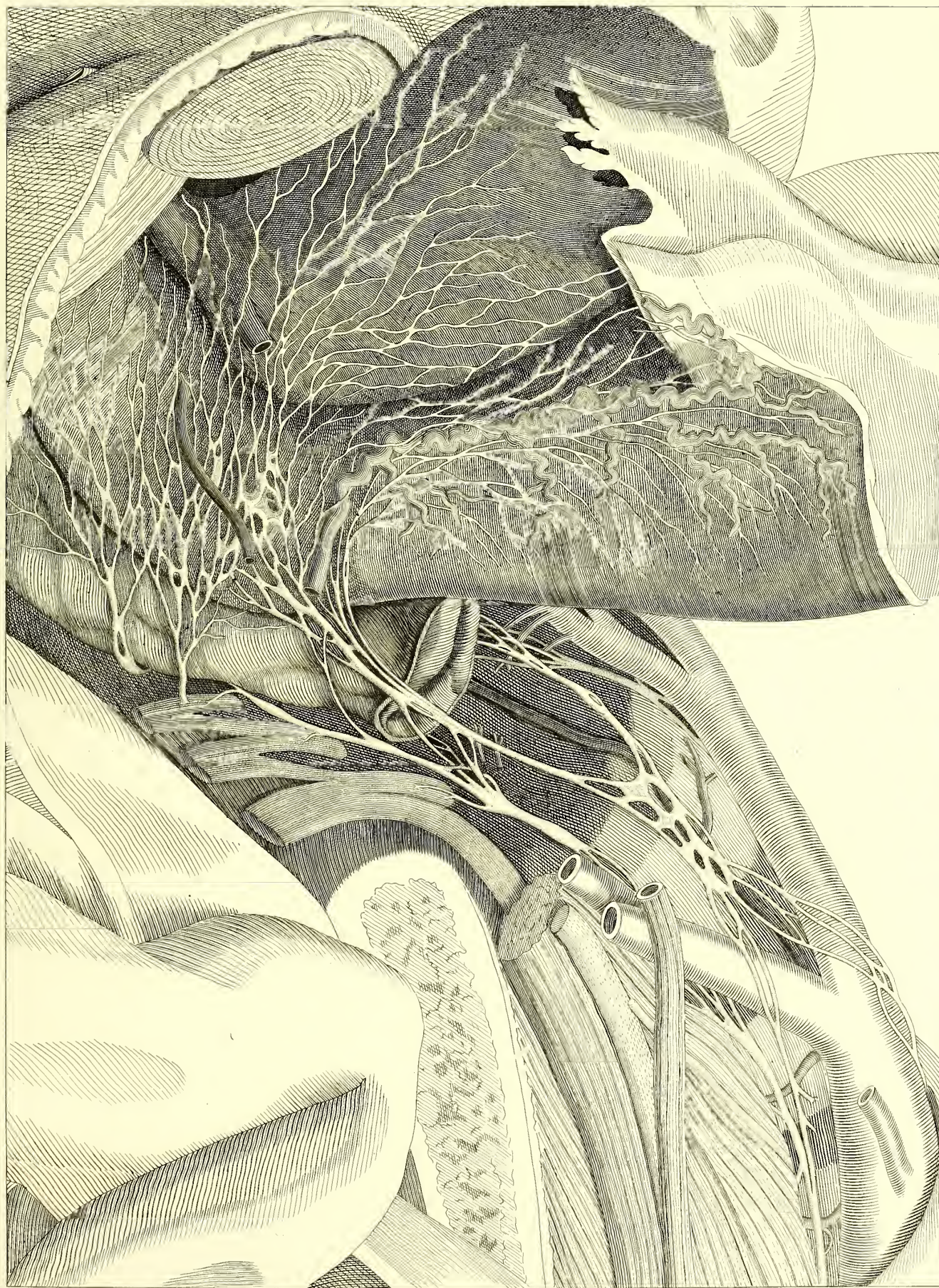
## PLATE XXI.

This plate shows the NERVES on the anterior part of the UTERUS within the PELVIS, which could not be displayed on Plate XIX.

This plate, also, is an exact copy from Tiedman.

In this plate all the ganglions and nerves of the vagina and uterus, towards the os tincae, are delineated, and their connections with the neighbouring ganglions.











## PLATE XXII.

Exhibits the PLEXUSES of NERVES situated in the PELVIS, from the same subject as Plate XIX. The os coxyges and the muscles of the left side are removed.

The plate is in outline, with references to all the parts expressed in Plate XXI.

*Explanation of the Figures of Reference.*

1. The second lumbar ganglion.
2. A branch from the third lumbar nerve going to the ganglion.
3. A branch going to the superior hypogastric plexus.
4. Shoots cut off that were going to the inferior mesenteric plexus.
5. Branches going across the left iliac artery, and going with those of the opposite side to the common uterine plexus.
- 6, 6. Branches of the right sympathetic nerve going to the uterine plexus.
- 7, 7. The superior hypogastric or common uterine plexus.
8. The left branch from the hypogastric plexus descending to the left hypogastric or uterine plexus.
9. The branch between the second and third lumbar ganglions.
10. The anastomosing shoot, which goes from the third lumbar nerve to the third lumbar ganglion.
11. The third lumbar ganglion.
12. A branch joining the fourth lumbar nerve and the third lumbar ganglion.
13. The anastomosing root of the third lumbar ganglion with the fourth.
14. The fourth lumbar ganglion, from which branches







go out, that pass behind the iliac artery to the superior lateral uterine plexus, also to the fifth lumbar ganglion.

15. Small anastomosing branches between the fourth and fifth lumbar ganglions.

16. Fifth lumbar ganglion.

17. First sacral ganglion.

18. Branches which connect this ganglion to the superior uterine plexus of the left side.

19. The branch which joins this ganglion with the uterine plexus.

20. The superior hypogastric or uterine plexus.

21. Second sacral ganglion.

22. Third sacral ganglion.

23. A shoot which the second sacral ganglion sends to the uterine plexus.

24. Branches which pass to the uterus with the artery.

25, 25, 25, 25, 25, 25. Shoots that proceed to the posterior surface of the uterus, and enter its substance.

26, 26. Branches cut off, which take their origin from the spermatic plexus, and are spread over the ovarium and Fallopian tube with the spermatic artery.

27. A shoot anastomosing with the nerves of the uterus.

28. Nerves which descend from the hypogastric or superior lateral uterine plexus, to the inferior hypogastric or uterine plexus.

29, 29. The inferior ganglionic plexus.

30. The fifth lumbar nerve.

31. First sacral nerve.

32. The branch that joins the first sacral nerve and the first sacral ganglion.

33. Second sacral nerve.

34. Third sacral nerve.

35. A small communicating branch between the second nerve and second sacral ganglion.

36. Anastomosing branch between the third sacral nerve and third sacral ganglion.

37. Branch of the third sacral nerve, which joins with the ganglions or inferior hypogastric plexus.

38. The superior pudic nerve.

39, 39, 39, 39, 39. Nervous shoots from the ganglionic plexus, which pass on to the anterior surface of the uterus.

40, 40, 40, 40, 40. Nervous shoots going to the urinary bladder.

41, 41, 41, 41, 41. Nerves distributed on the vagina.

42, 42. Nerves going to the rectum.

## PLATE XXIII.

In this plate are shown the **TERMINAL NERVES** of the **PAPILLÆ**  
of the **TONGUE**, which constitute the organ of taste.

Fig. 1. The external appearance of the papillæ upon the anterior part of the tip of the tongue, magnified ten diameters.

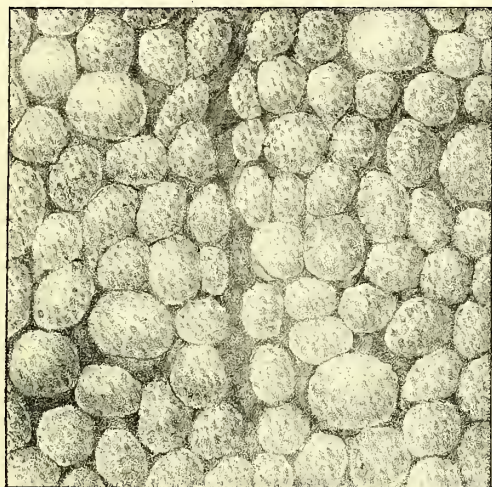
Fig. 2. The bases of these papillæ exposed, being cut through by a transverse section, showing them to be made up of nerves with corresponding arteries. The arteries having been injected renders the nerves more readily distinguished. The parts are magnified ten diameters.

Fig. 3. A longitudinal section of the papillæ, extended into the substance of the tongue, showing the termination of the nervous filaments at the points of the papillæ united to one another, forming an expansion to afford extent of surface for the purpose of increasing the sensibility of the organ, magnified twenty diameters.

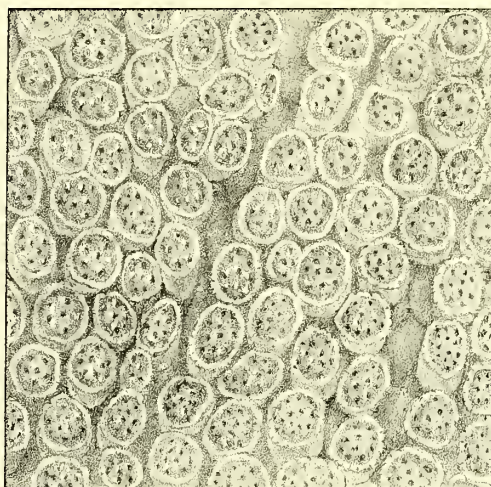
Fig. 4. A longitudinal section of a single papilla, one half of the arteries and nerves simply exposed, the other half unravelled to render the nervous filaments more distinctly seen. The external membrane, by which the papilla is naturally covered, is turned on one side. The parts are magnified forty diameters.



1



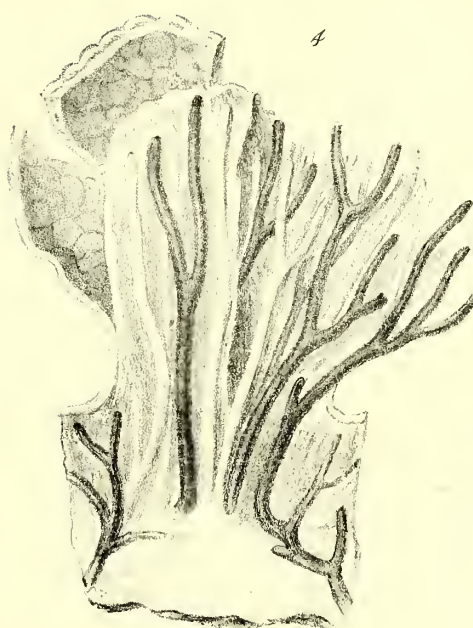
2



3



4







## PLATE XXIV.

TERMINAL NERVES of the PAPILLÆ of the CLITORIS, for the purpose of giving the necessary sensibility to that organ.

This plate contains four figures.

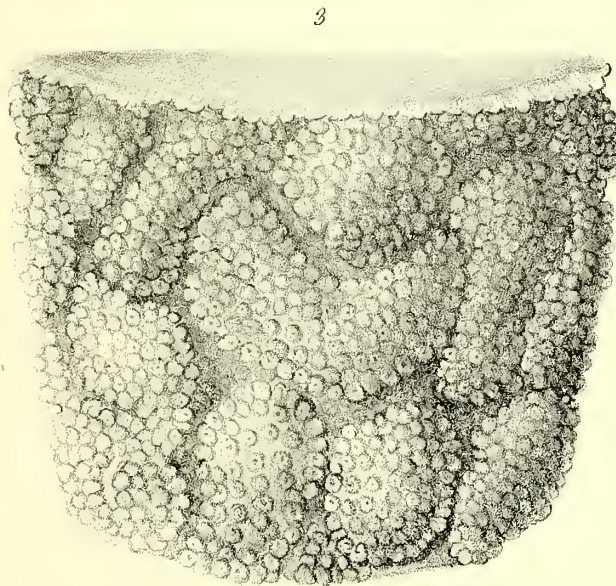
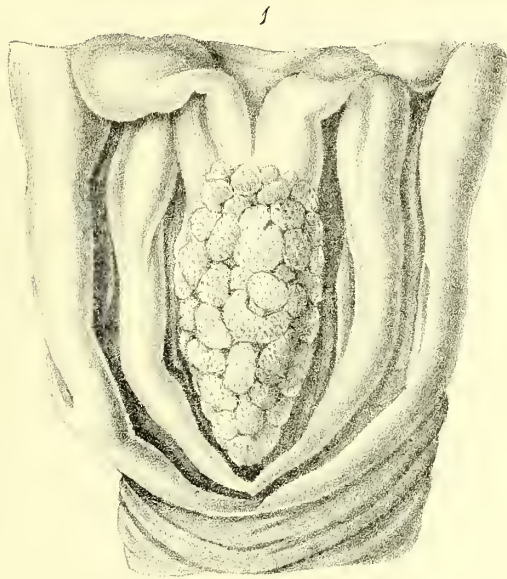
Fig. 1. The human clitoris denuded, but the preputium not removed, magnified three diameters.

Fig. 2. The same parts magnified six diameters.

Fig. 3. A section of the clitoris viewed laterally, magnified six diameters.

Fig. 4. A portion of the surface of the clitoris, covered with nervous papillæ, magnified twenty-five diameters.

Tab. B.







## PLATE XXV.

Represents the NERVES of the HUMAN PLACENTA, and those of the funis umbilicalis, discovered by the author. This discovery enables us to explain the nature of the connection between the brain of the mother and that of the child, which before it was made could not be conjectured.

Fig. 1. A portion of the human funis umbilicalis, magnified four diameters.

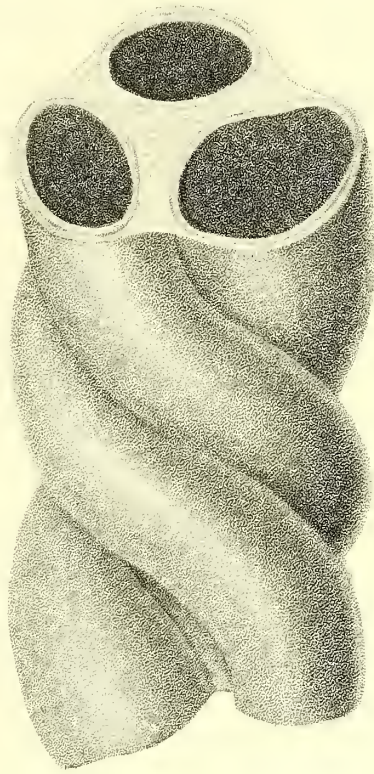
Fig. 2. The same with a nerve exposed, magnified in the same degree.

Fig. 3. A single nerve of the same chord, magnified four diameters.

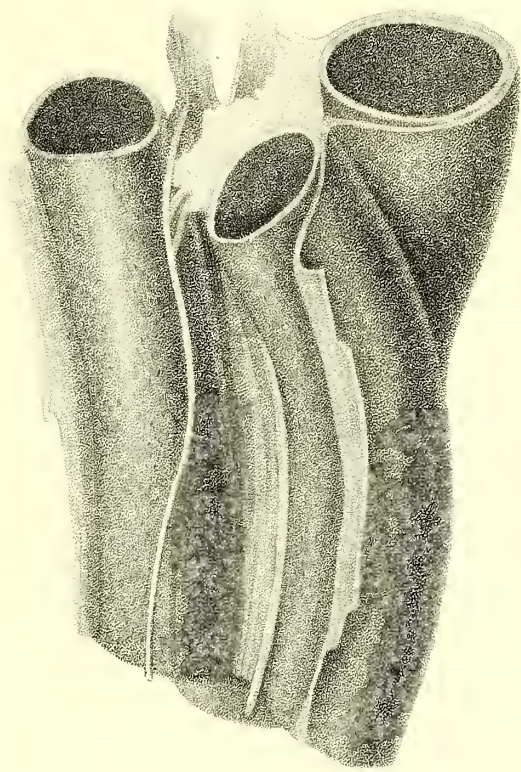
Fig. 4. The same nerve magnified ten diameters.

Fig. 5. A nerve dividing into two branches, crossing the amnion, magnified four diameters.

Fig. 1.



2



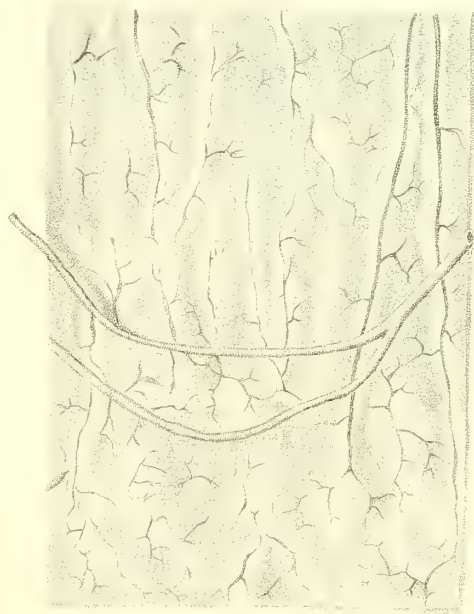
3



4



5





## PLATE XXVI.

Represents the NERVES of the PLACENTA of the SEAL exposed, both on the membranous part of the chorion and in the substance of the placenta.



Fig. 1. A portion of the placenta of the seal, exposing the nerves contained in the folds of the chorion, magnified four diameters.

Fig. 2. The uterine surface of the same portion, magnified in the same degree, to show the nerves enveloped in a spongy mass.

Fig. 3. A portion of the last figure magnified ten diameters, to show its structure and the ends of broken nerves.

Fig. 4. A transverse section, magnified ten diameters.

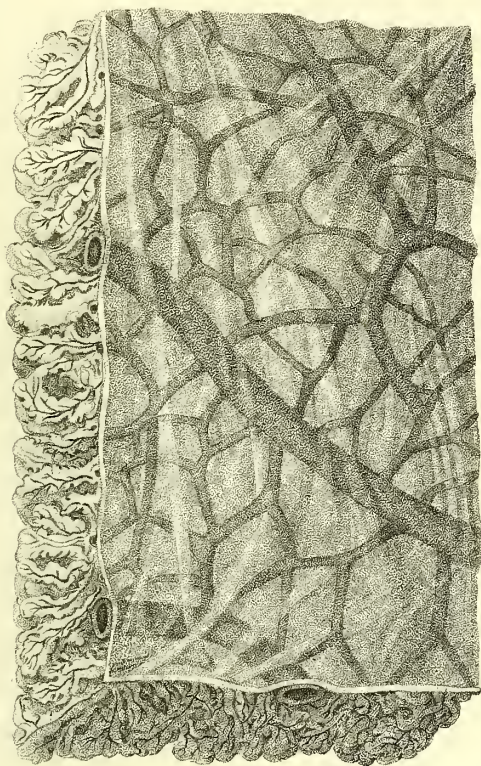
Fig. 5. and 6. A single floculus, magnified ten diameters.

A, the pencilli ; B, the surface of the chorion.

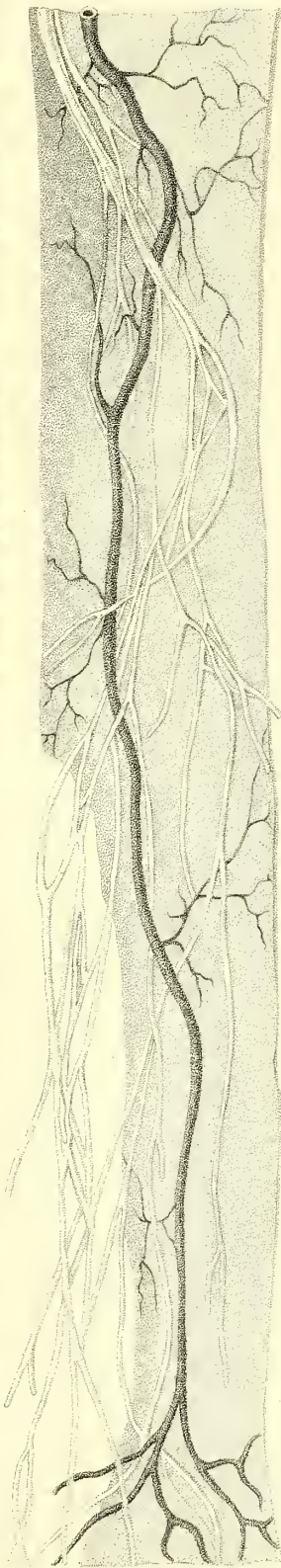
Fig. 7. The mode in which the arteries ramify, magnified two diameters.



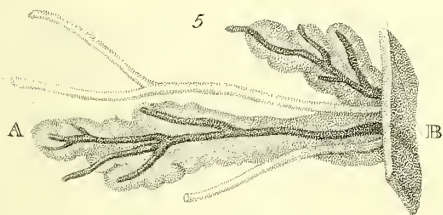
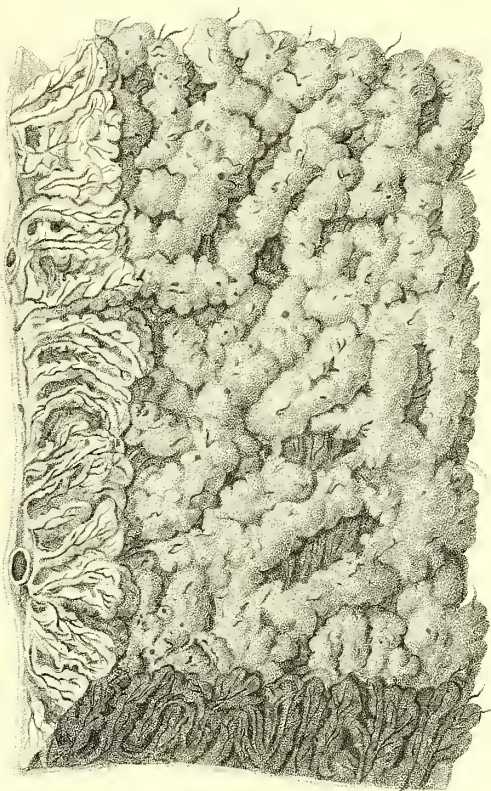
Fig. 1.



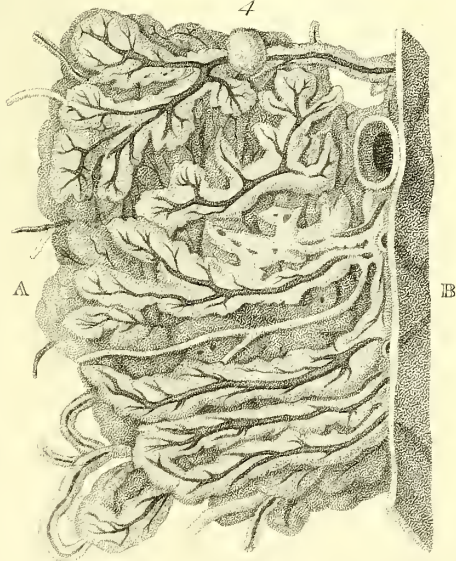
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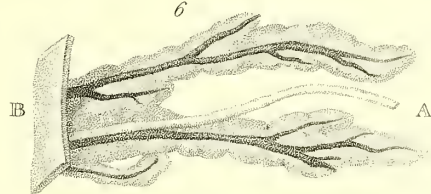
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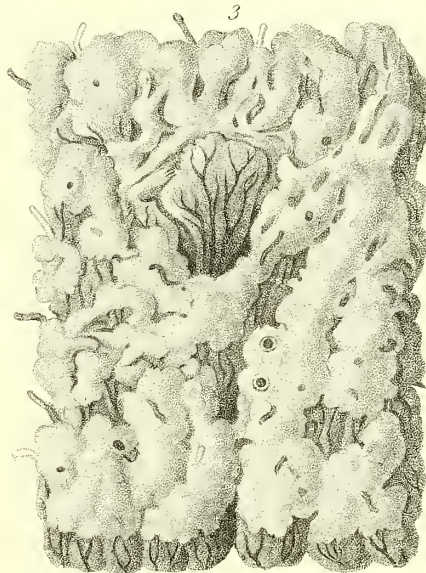
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6



3







## PLATE XXVII.

Represents the NERVES in the CHORION of the TAPIR, which performs the office of the placenta.

Fig. 1. The uterine surface of the chorion, natural size.

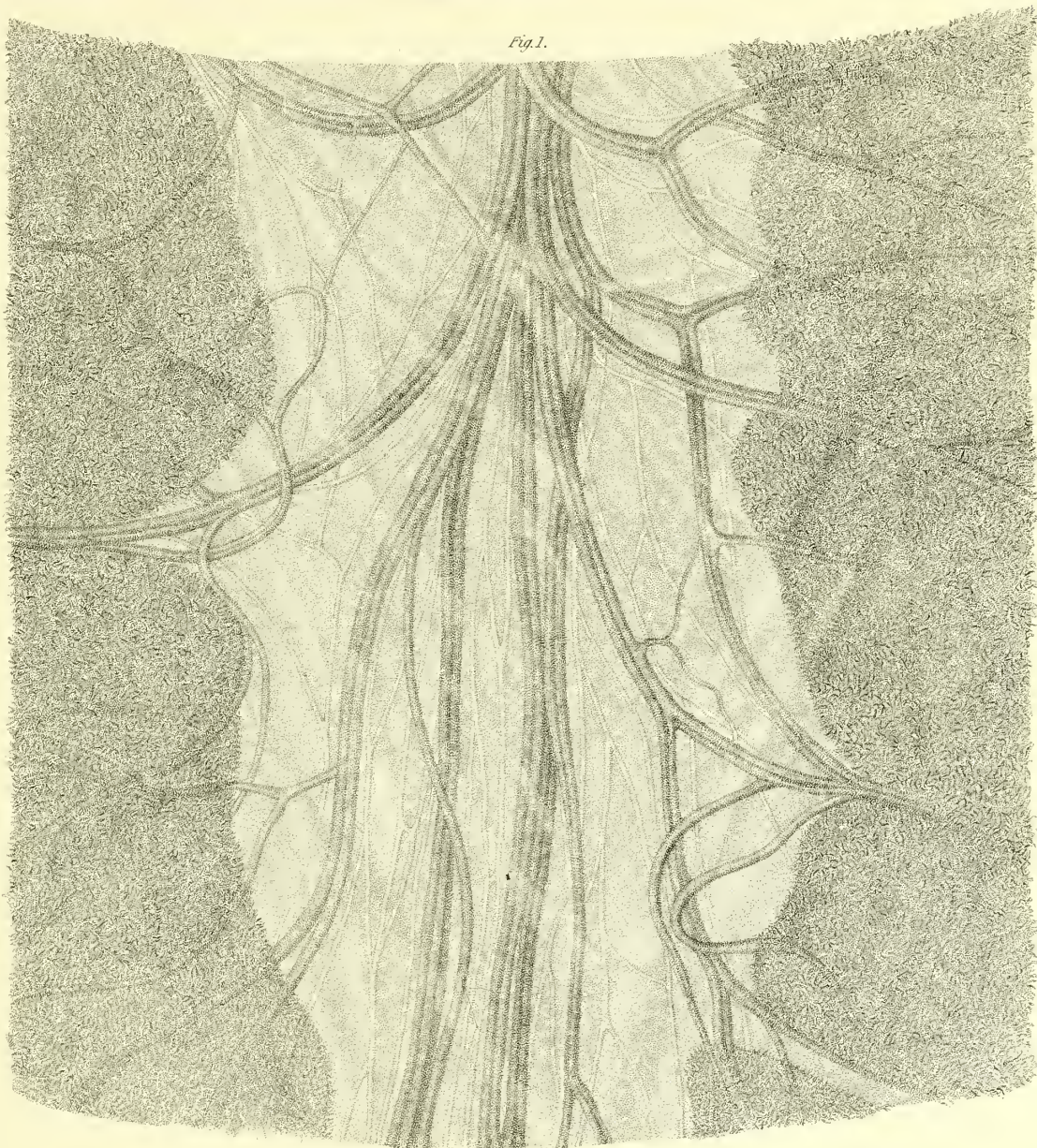
Fig. 2. A smaller portion, magnified fifty diameters.

Fig. 3. A section magnified in the same degree.

Fig. 4. The foetal surface equally magnified.



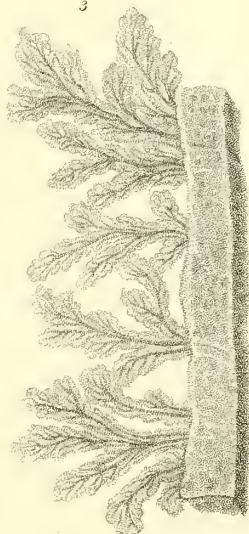
Fig. 1.



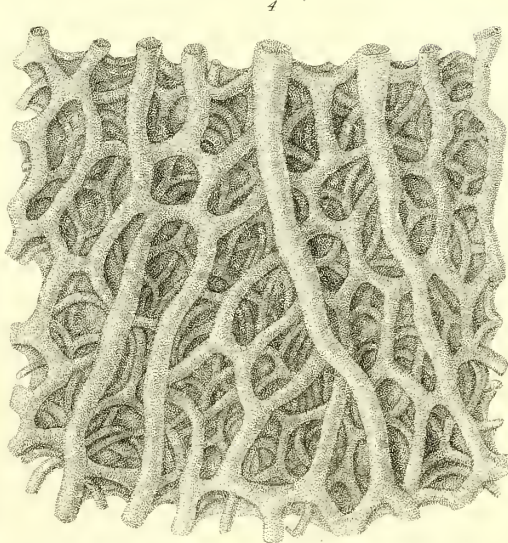
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3



4







## PLATE XXVIII.

This plate represents the OVA and CARINA in the WHITE BAIT, the OVA and the CARINA of the SHAD, the OVA and the CARINA of the SPRAT, and the same parts in the HERRING, showing that the carina of the white bait resembles that of the shad, and the carina of the sprat that of the herring.

Fig. 1. Ova of a white bait, about an inch and a half long, magnified twenty-five diameters.

Fig. 2. One eighth of an inch of the serrated carina of the above fish, magnified twenty diameters.

Fig. 3. Ova of a white bait about three inches long, magnified twenty-five diameters.

Fig. 4. One eighth of an inch of the serrated carina of the same fish, magnified twenty diameters.

Fig. 5. Ova of a shad about thirteen inches long, magnified ten diameters.

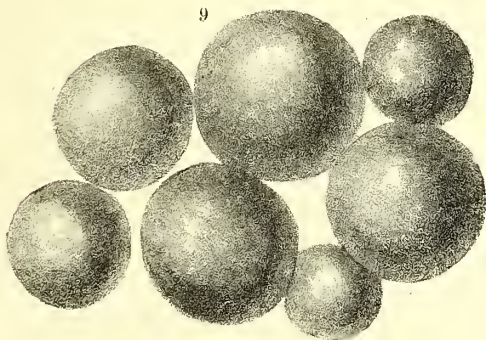
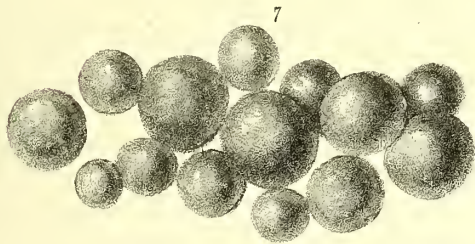
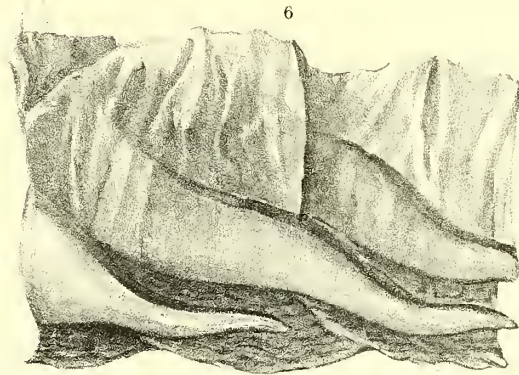
Fig. 6. One eighth of an inch of the serrated carina of the same fish; the scales from one side are removed to bring the indented carina to view, magnified ten diameters.

Fig. 7. Ova of a sprat about four inches long, magnified ten diameters.

Fig. 8. One eighth of an inch of the serrated carina of the same fish, magnified ten diameters.

Fig. 9. Ova of a herring about ten inches long, magnified sixteen diameters.

Fig. 10. One eighth of an inch of the serrated carina of the herring, magnified ten diameters.







## PLATE XXIX.

Represents MUSCULAR FIBRES magnified in different degrees, to show the size of the ultimate fibres, and the degree of the elasticity which they possess : these are the same in the human body and all quadrupeds.

Fig. 1. A fasciculus of muscular fibres, taken from the large straight muscle that raises the head of the bullock, showing the fibres of which it is composed, magnified 100 diameters.

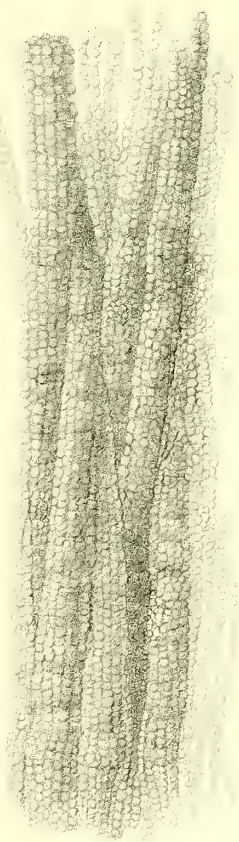
Fig. 2. Another fasciculus magnified 200 diameters.

Fig. 3. Five of the globules which form the single fibre in the contracted state, magnified 400 diameters : measuring one inch.

Fig. 4. The same elongated, measuring an inch and a half.

The calf was selected, the fibres admitting of more extension in the young, than in the full grown animal.

Fig. 1.



3.



4.



Fig. 2.







## PLATE XXX.

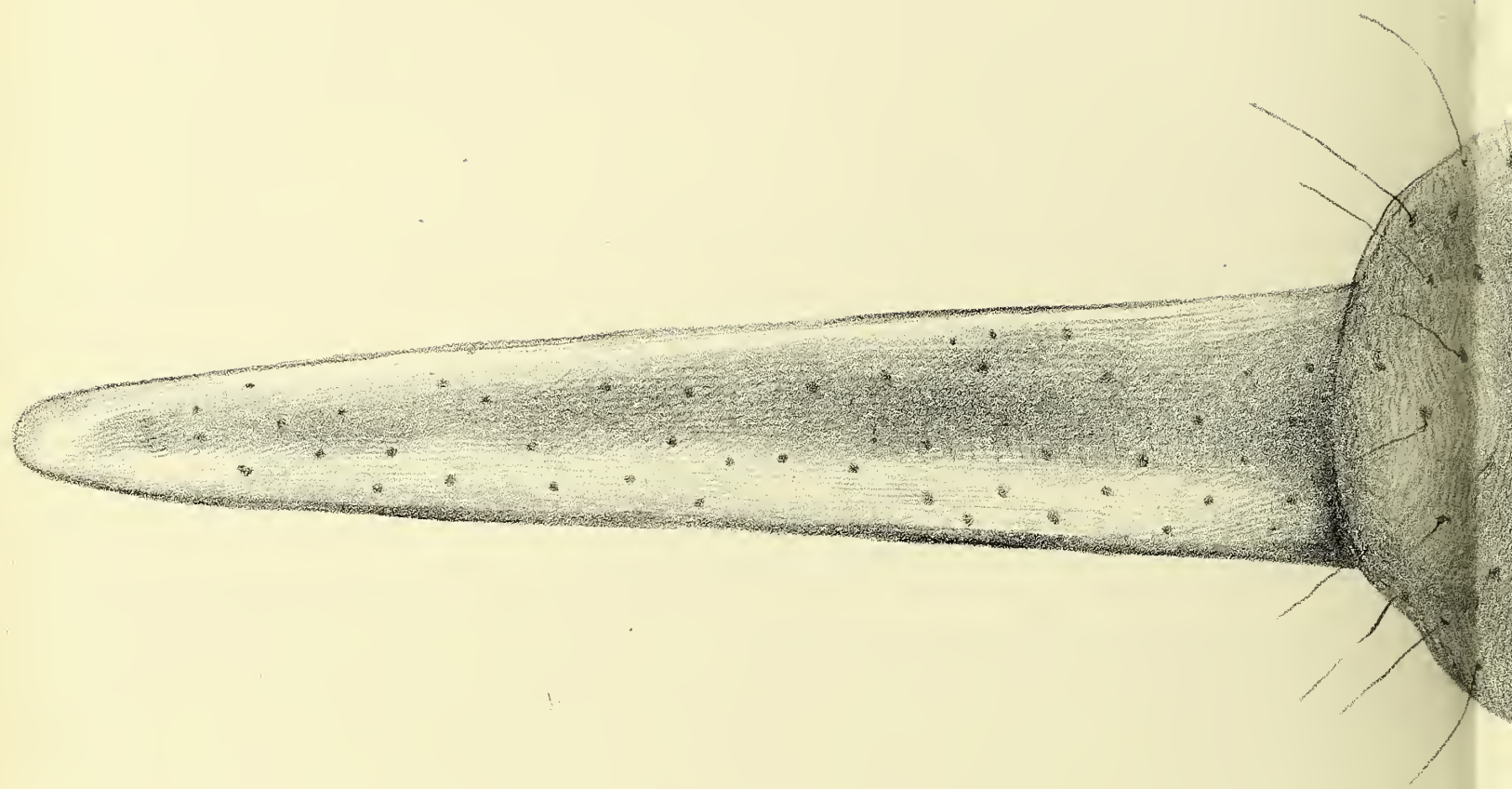
This plate represents the XARIFFA'S TONGUE, to show its extensibility.

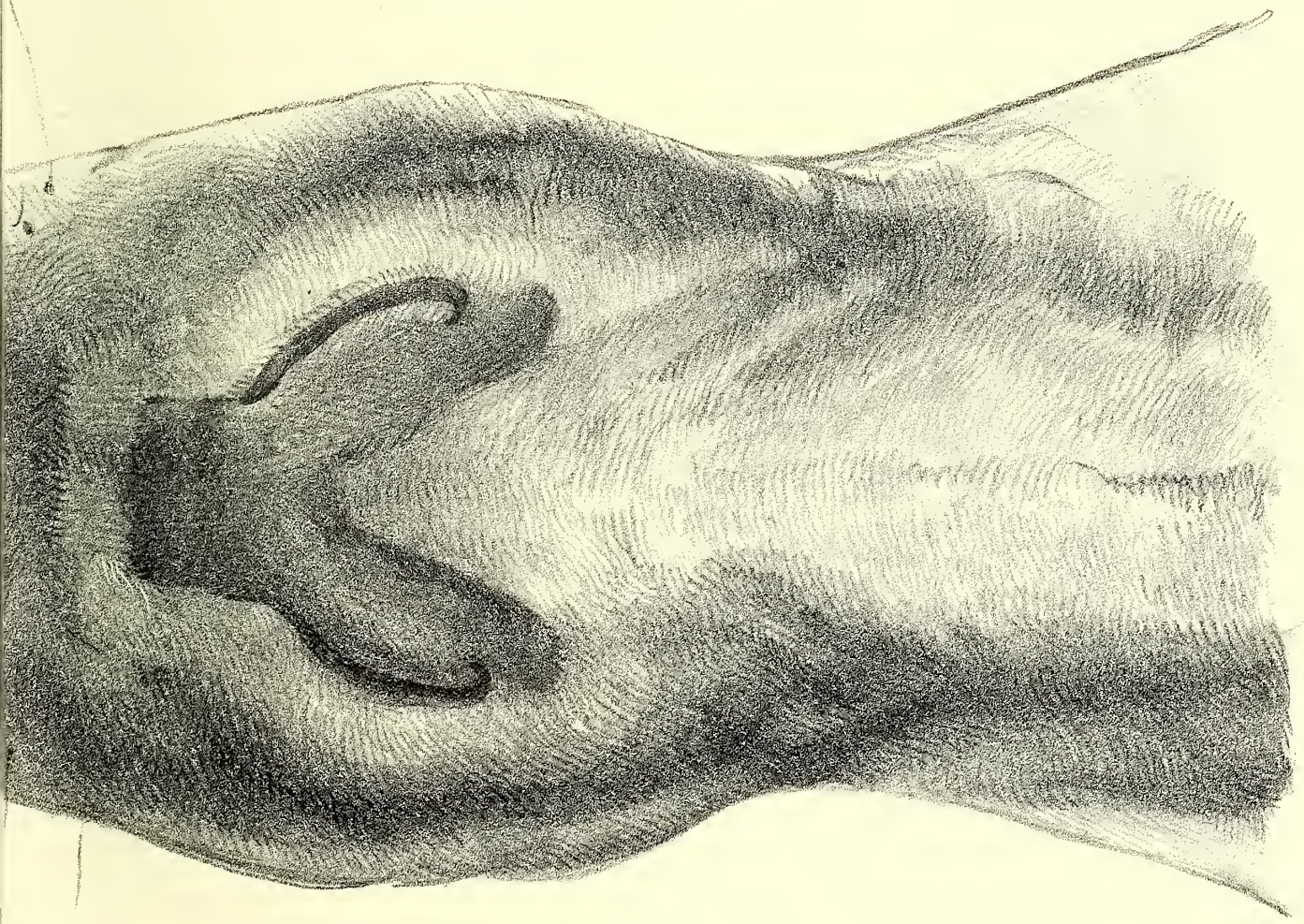
The tongue is extended to its greatest length in a straight line, the figure of the natural size in the living animal.

The tongue of the xariffa in an extended state, to show its extreme length, and the form it puts on when stretched out.













## PLATE XXXI.

Represents the XARIFFA'S TONGUE in a flexible state,  
answering the purpose of a hand, or proboscis.

The tongue of the xariffa employed in clearing the animal's nostrils, showing the great facility with which its form is adapted to any purpose useful to the animal.

The figure is of the natural size, and is taken from life.







**PLATE XXXII.**

The XARIFFA'S TONGUE, in the act of pulling down a branch  
to supply the animal with food.

The xariffa's tongue having laid hold of a young shoot of the branch of a tree which was above its head, is in the act of bringing it down into its mouth, which it could not have done without the assistance of its tongue.



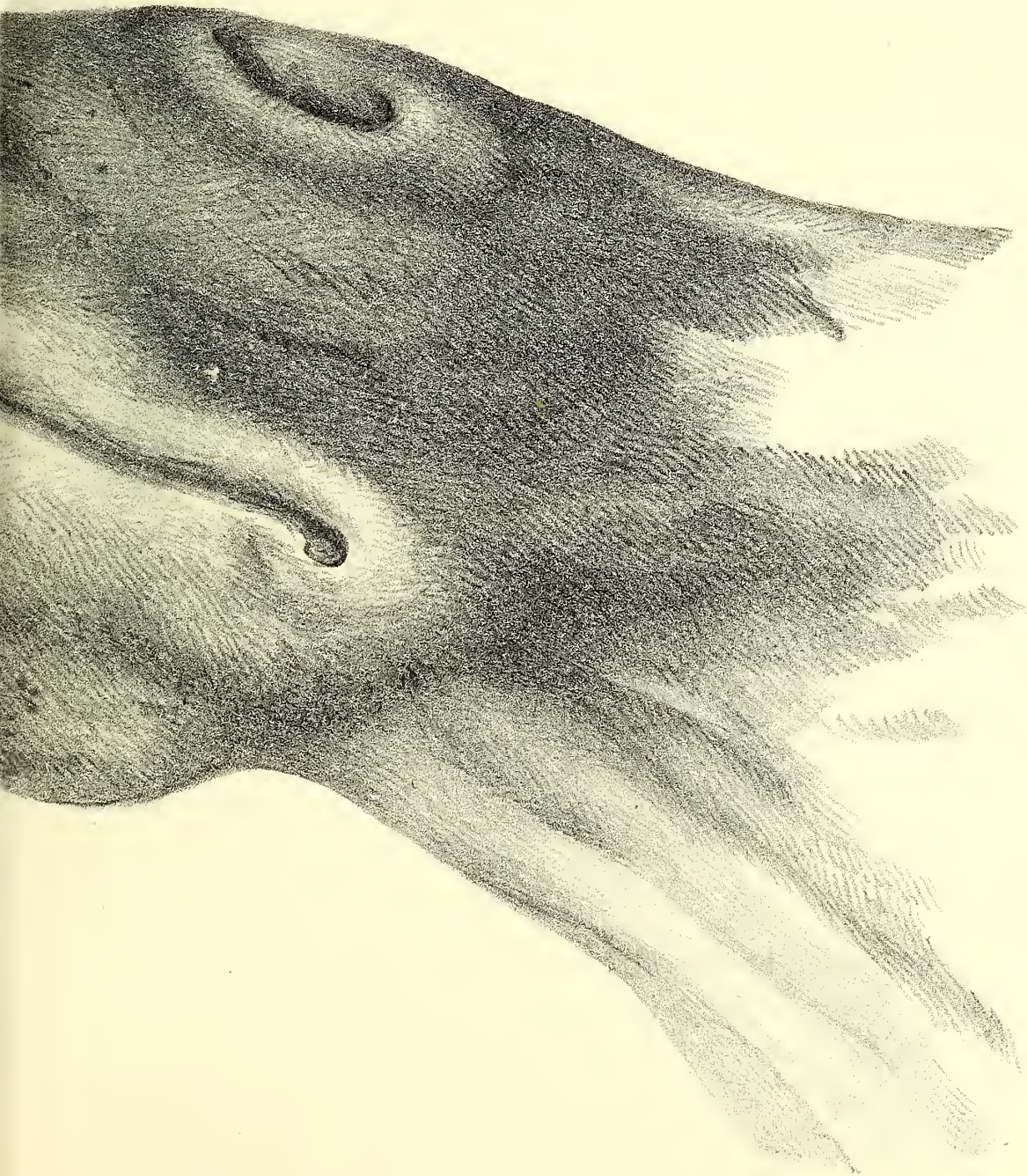








Printed by Engelbrecht, and Corbitt & Co.



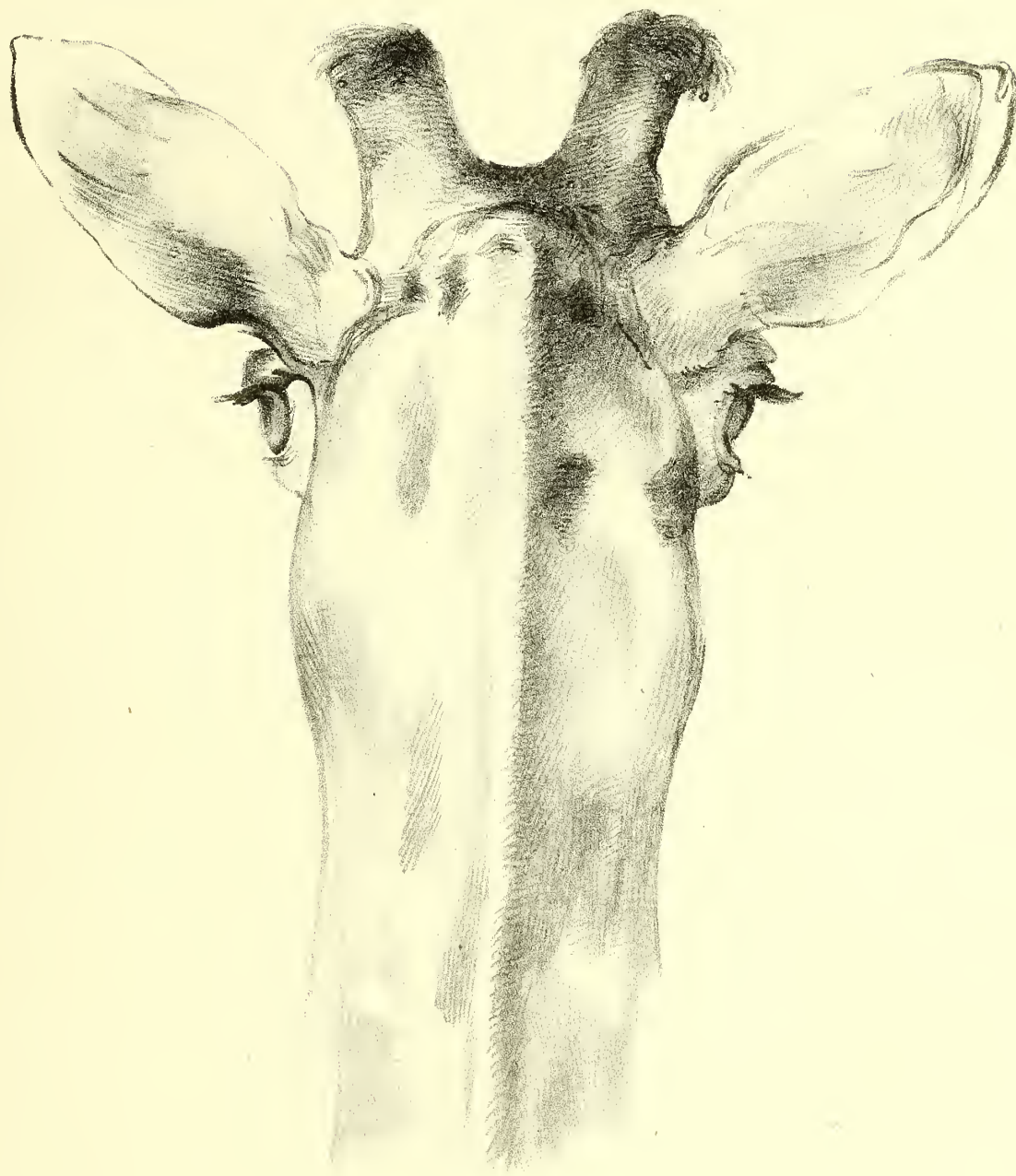


**PLATE XXXIII.**

The XARIFFA'S HEAD, to show that the eyes are so placed as  
to see behind the animal.

A back view of the head of the xariffa, showing that the eyes have an unusually lateral position, enabling the animal to see objects immediately behind it, as well as those that are lateral or placed before it.







## PLATE XXXIV.

In this plate are represented four views of the left hind  
FLIPPER of the WALRUS.

The flipper had been kept for a long time in strong brine, by which the parts are much shrunk and corrugated ; but even in this state they show the concavity occasionally formed by the great and little toe encircling the others.

Figs. 1. and 2. show the flipper expanded and contracted when the foot is prone.

Figs. 3. and 4. show the flipper expanded and contracted when the foot is supine.

The parts are diminished to one fourth of the natural size.



Fig. 1.

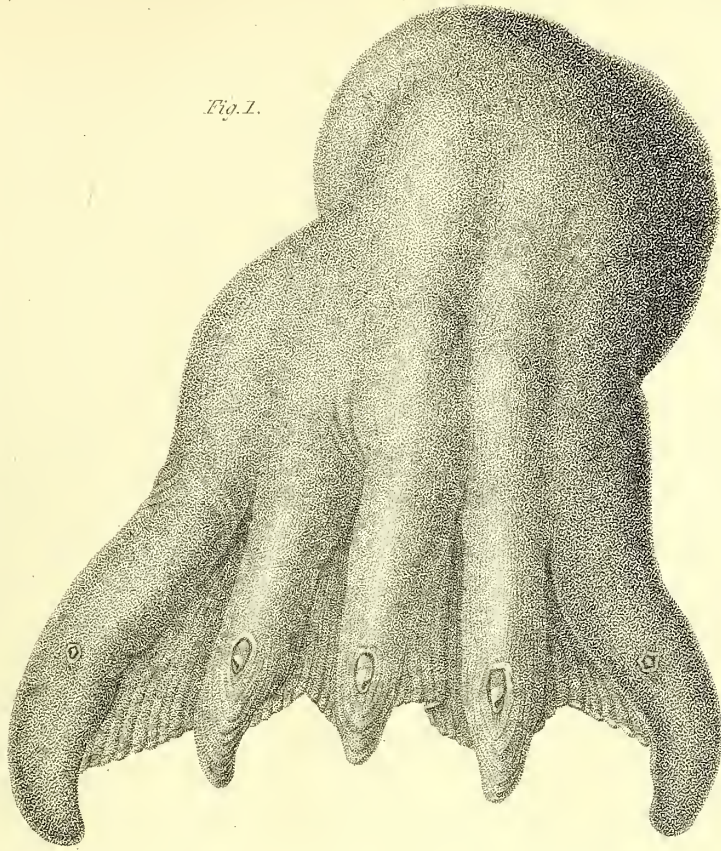


Fig. 2.

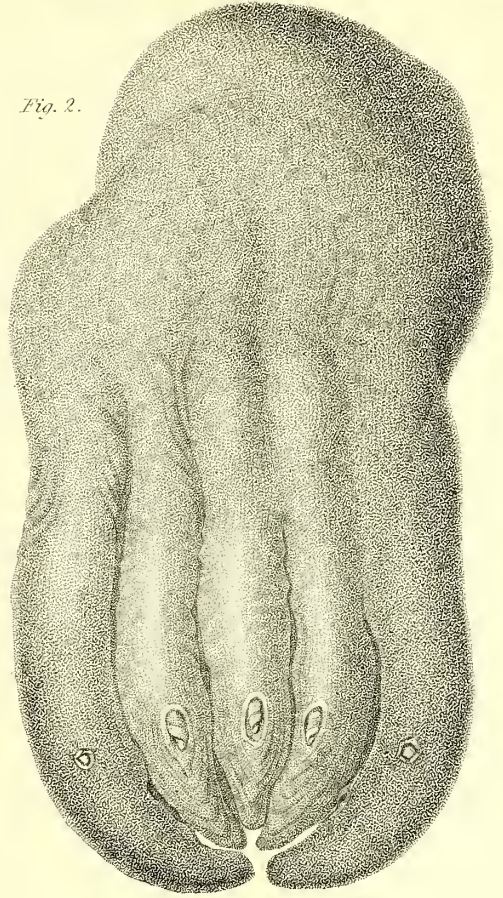


Fig. 3.

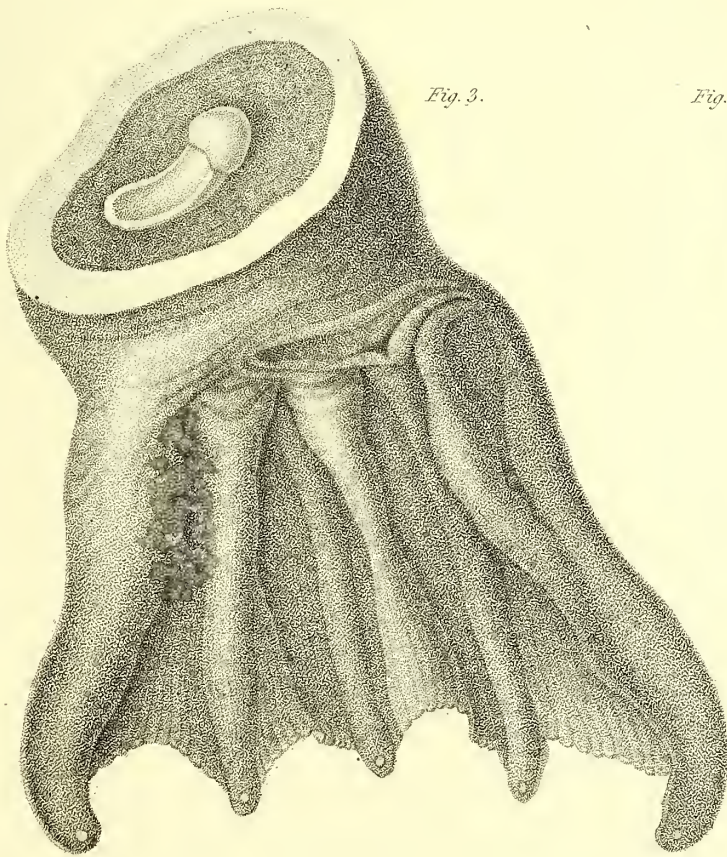
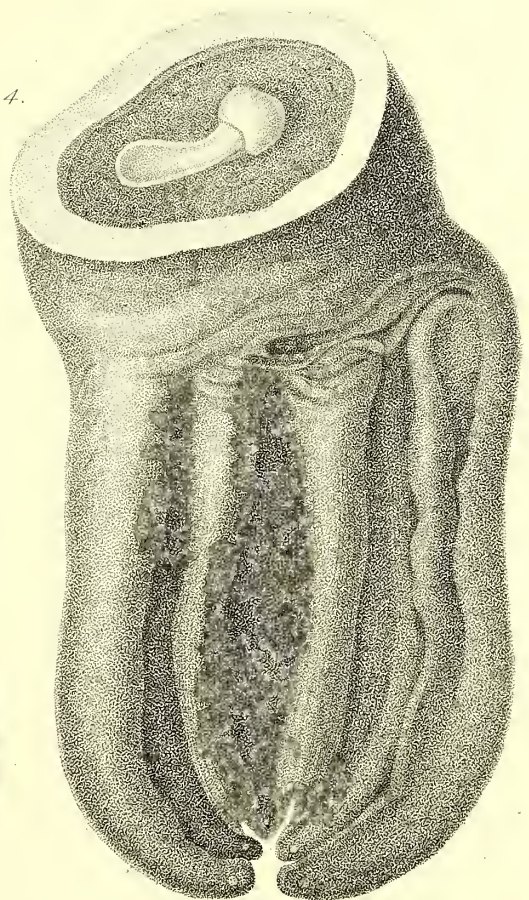


Fig. 4.



One foot.



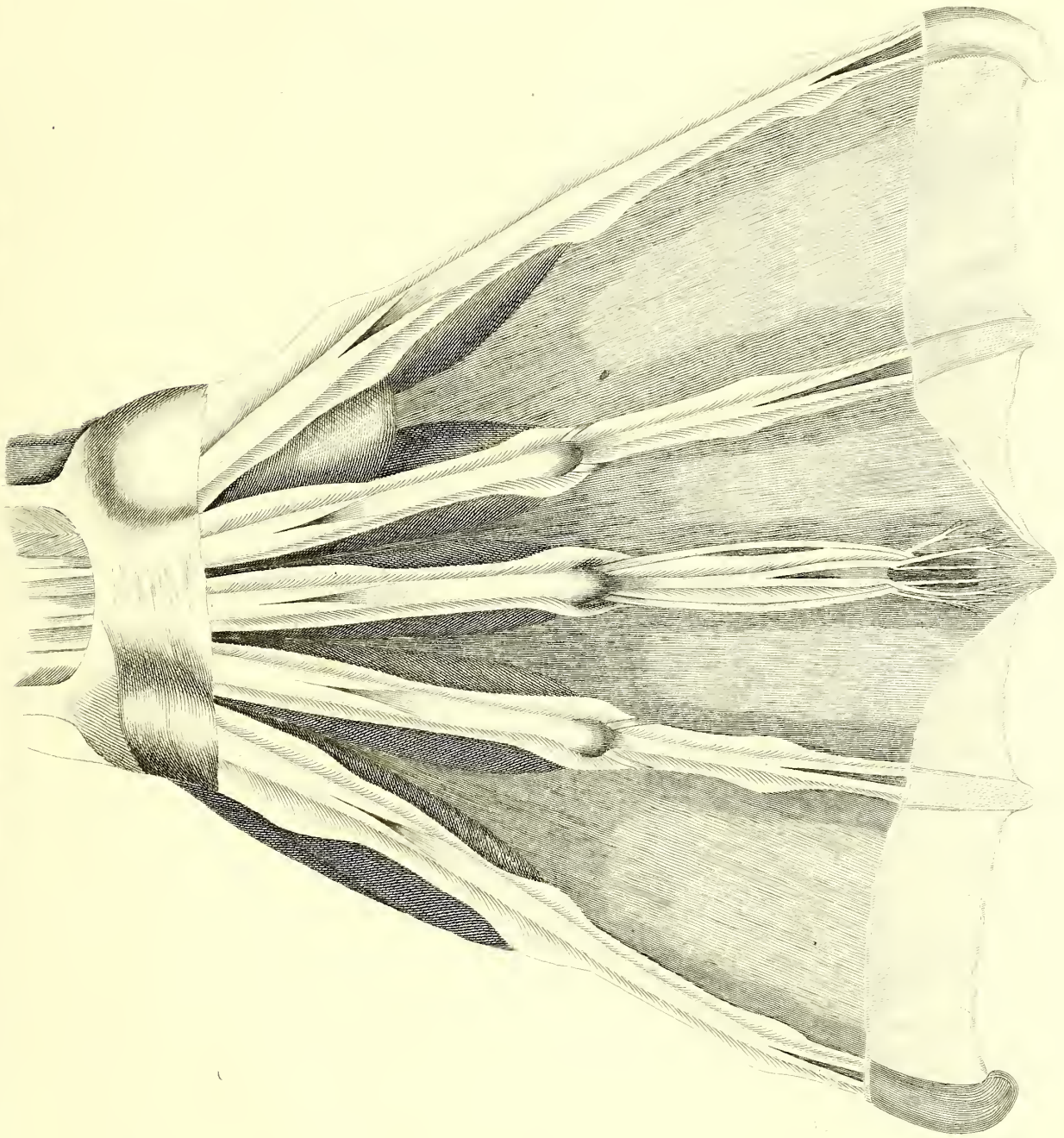


## PLATE XXXV.

Shows the BONES and TENDONS contained in the FLIPPER, the thick rugous skin on the palm of the flipper being dissected off.

In this state it loses all resemblance to a foot, and looks exactly like the hand of a giant with a span of twenty-eight inches.

The flipper in this figure is reduced to one fourth of the natural size ; the bones, muscles, and tendons, correspond with those of the human hand : the lumbricales muscles alone are wanting, their use not being required in any action the flipper has to perform.



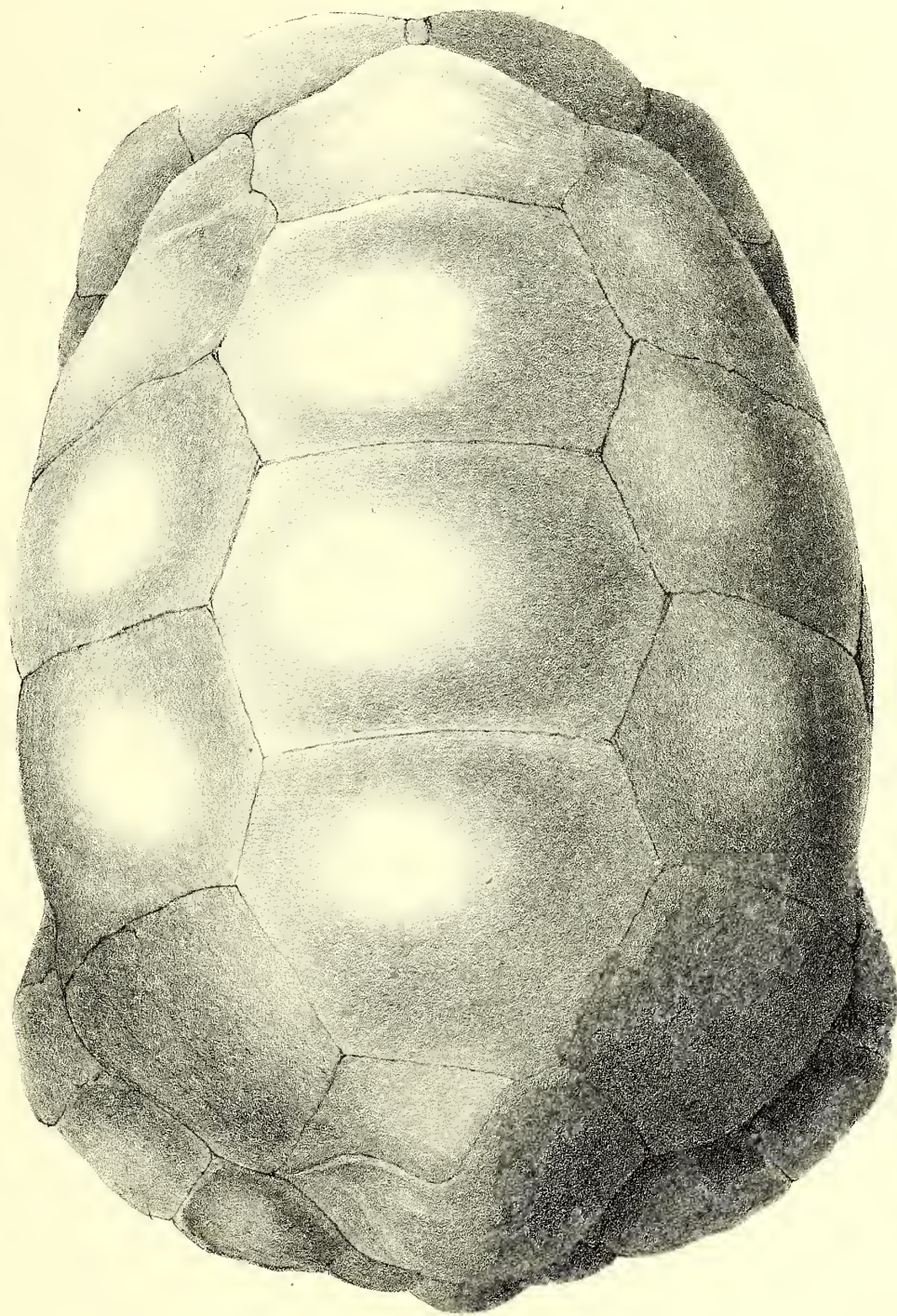




## PLATE XXXVI.

This plate shows the upper view of the SHELL of the  
TURTLE, from the Sachella isles, representing its general  
form.

The upper shell of the tortoise from the Sachella isles, in which there is no peculiar difference from those of land-tortoises in general.



TURTLE SHELL.





## PLATE XXXVII.

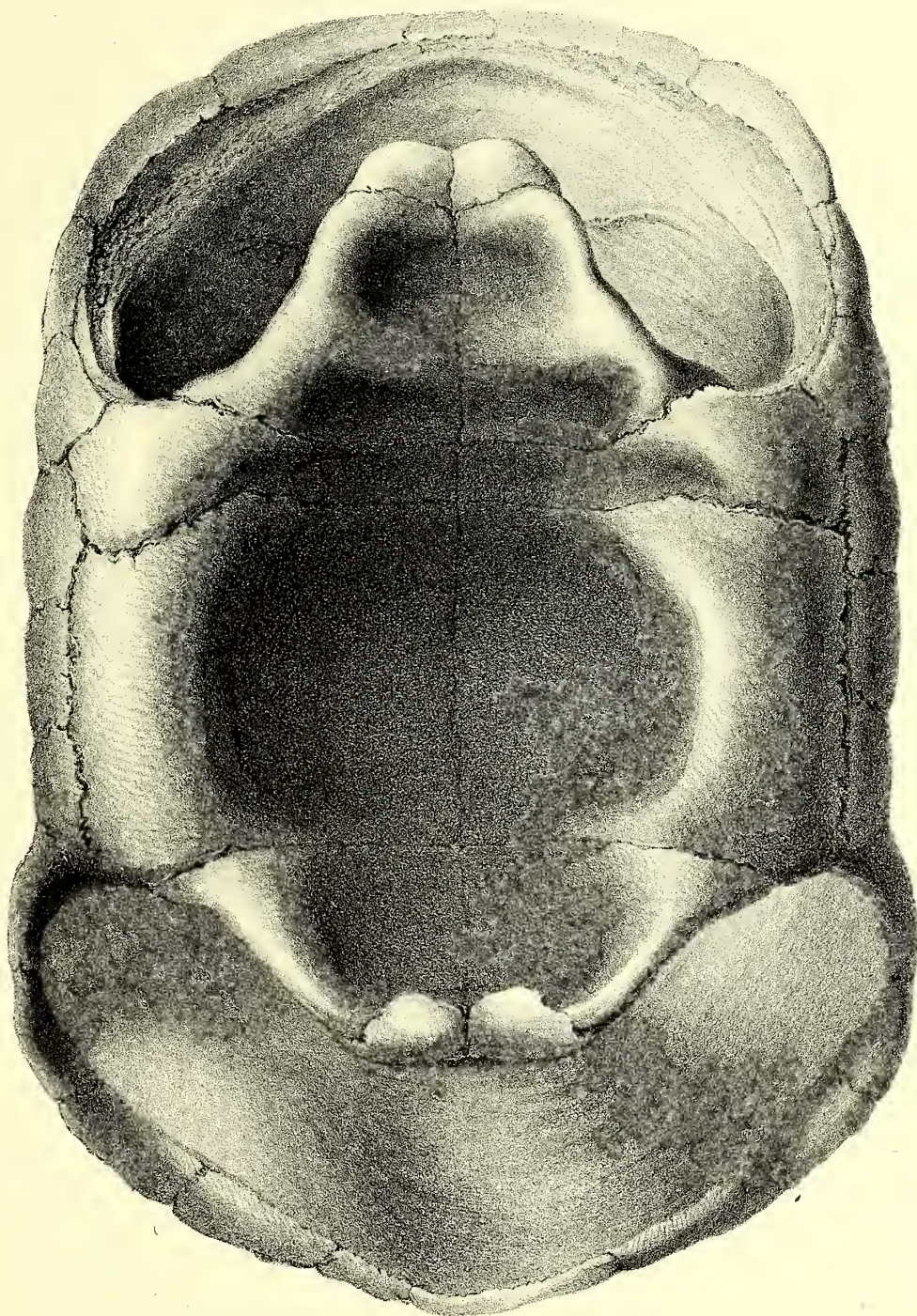
A view of the UNDER SHELL of the TORTOISE from the Sachella islands, which is concave, to enable the animal to support itself on the surface of the water.

In this figure, the under surface of the shell of the tortoise, which is exposed to view, instead of being gently concave, as is the case in land-tortoises in common, has a regular deep circular concavity in the centre, which retains air when the animal takes the water, and buoys it up all the time the tortoise is on that element.

Length of the shell three feet.

Breadth of the shell two feet.

Depth of cavity four inches and a quarter.



*Depth of Cavity, 4 1/2 Inches*





## PLATE XXXVIII.

The EYE of COBITIS ANAPLEPS, a fish peculiar to the mouths of the rivers in the island of Surinam, commonly known by the name of the four-eyed fish, it being commonly believed to have four eyes.

This fish is noticed in the following extract from Stedman's Narrative, vol. i. ch. vii. p. 142., in which he says, "Having described Fort Amsterdam, I cannot leave it without taking notice of a very remarkable fish, always seen in great numbers near the fort, which has actually four eyes. It swims constantly with two above and two below the surface: it swims with incredible velocity, is the size of a smelt, and delights in brackish water: they are called coot-eye by the inhabitants, and are accounted not bad eating."

In this plate there are eight figures, to show the different parts of the organ.

Fig. 1. A side view of the head, in which the eye is distinctly seen, magnified three diameters.

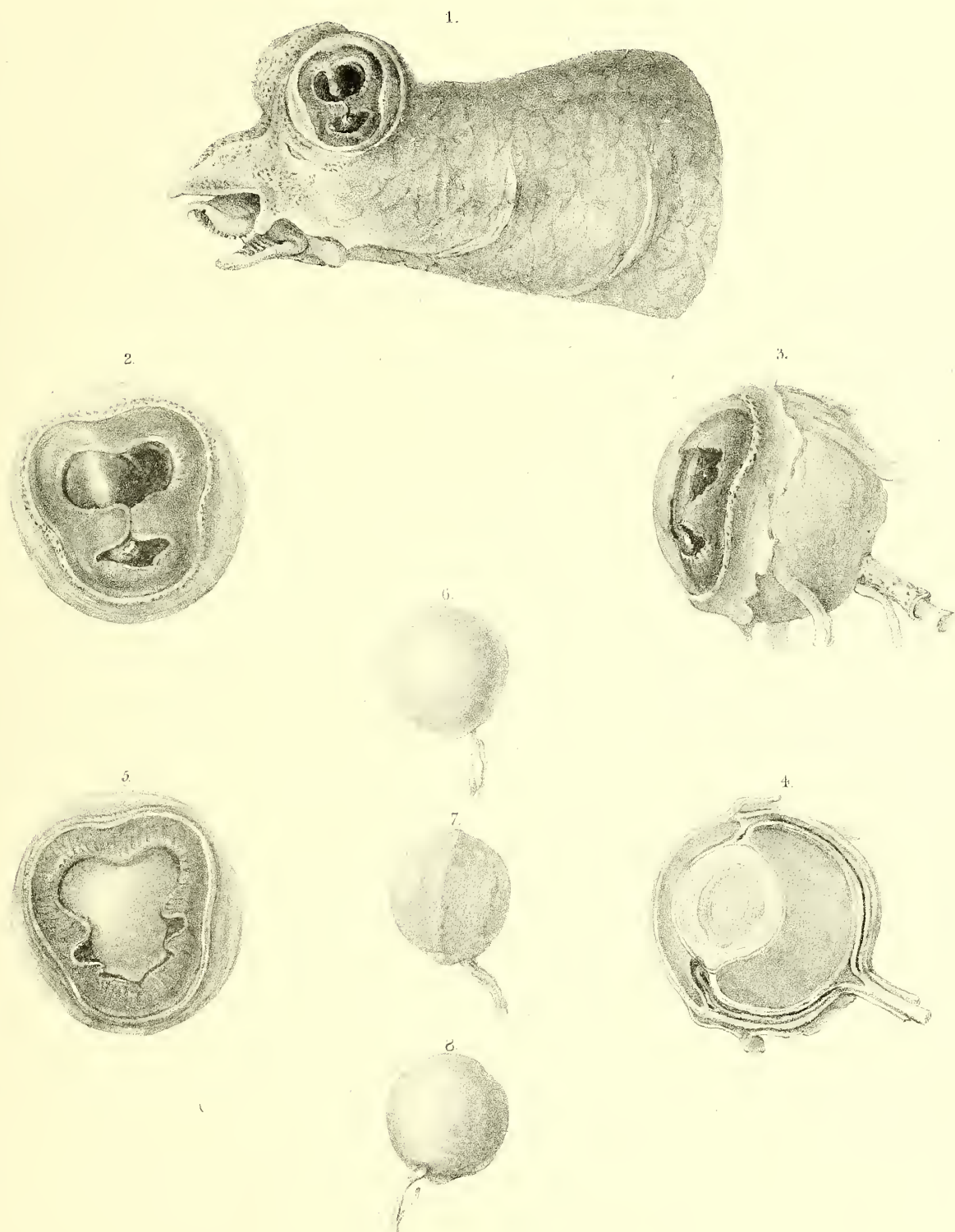
Fig. 2. The eye removed from the head, and seen in a front view.

Fig. 3. A side view of the eye.

Fig. 4. A transverse section of the eye to show the iris.

Fig. 5. A perpendicular section of the eye.

Figs. 6, 7, and 8. represent a newly discovered muscle, whose office is to depress the lens: it is shown in a front, lateral, and posterior view, attached to the capsule of the crystalline lens: the parts are magnified six diameters.







## PLATE XXXIX.

The HUMAN CAPSULA RENALIS, for the purpose of showing  
the internal structure.

The use for which I consider this gland intended is to  
arrest any oil that is in the circulation before it arrives at  
the kidneys, and by retaining it prevent its escape out of  
the body.

In this plate are five figures.

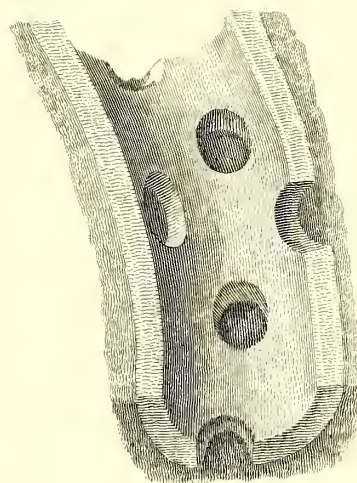
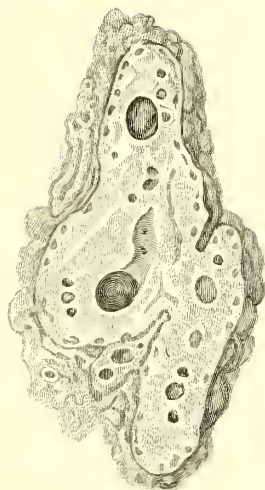
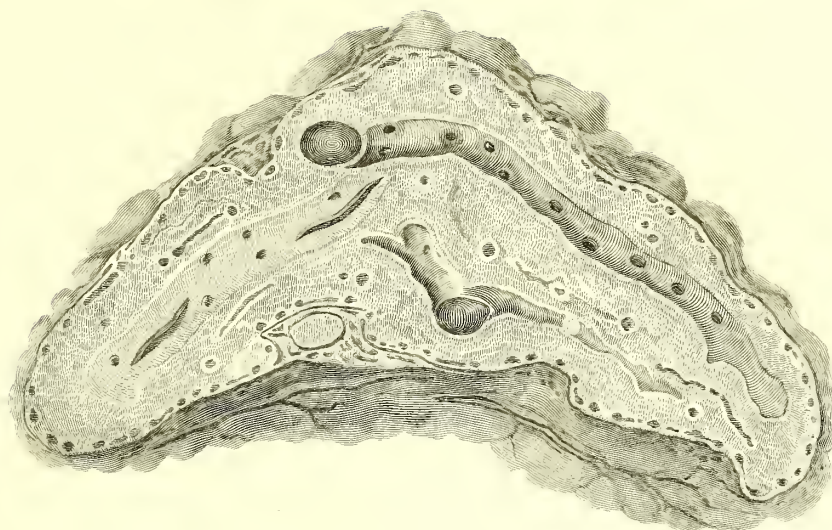
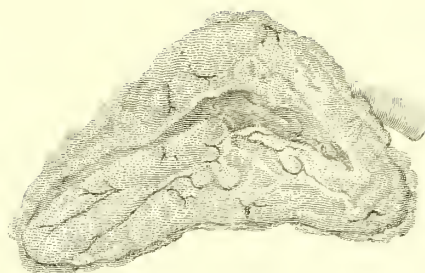
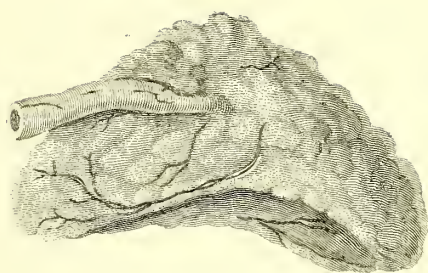
Fig. 1. The upper and posterior view of the gland, and the large vein exposed for some extent after it emerges from its substance ; natural size.

Fig. 2. The under surface, which lies next the kidney, in which is seen the course of one of the large branches of the vein, which appears to be a distinct internal cavity ; natural size.

Fig. 3. A vertical section of the whole gland, one of the three large branches of the capsular vein laid open, and the oil it contained removed, showing the lateral openings from the vein into the parenchymatous substance, magnified two diameters.

Fig. 4. A lateral view of a vertical section of the gland, in which the divided branches have their orifices exposed, magnified two diameters.

Fig. 5. A portion of the largest vein in the gland laid open, to show the lateral natural perforations in it, magnified ten diameters.







## PLATE XL.

The **RETE MUCOSUM**, which is not a membrane, as has been generally believed, but a pigment laid upon the surface of the cuticular covering next the cutis, is shown in this plate, both in the Negro and the European.

The rete mucosum spread upon the cuticular covering immediately over it. This layer of cuticle has been hitherto mistaken for the rete mucosum itself, while it is only the membrane, on the under surface of which the paint is laid.

Fig. 1. The external surface of the cuticle in the Negro, through which the rete mucosum is seen; the parts are magnified three diameters.

Fig. 2. The rete mucosum itself exposed to view, lying upon the under surface of the cuticle; the parts are magnified ten diameters.

Fig. 3. The rete mucosum detached and spread upon glass, magnified 100 diameters.

Fig. 4. The surface of the rete mucosum in the European exposed, magnified ten diameters.

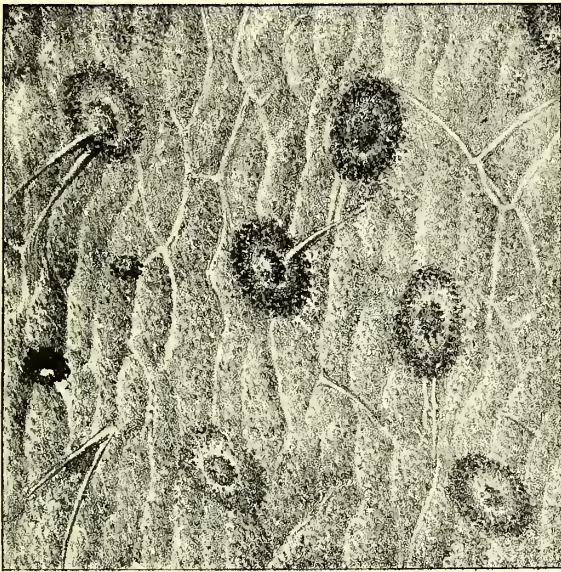
Fig. 5. The rete mucosum of the European spread upon glass, magnified 100 diameters.

Fig. 6. The rete mucosum of a duck's foot exposed, magnified ten diameters.

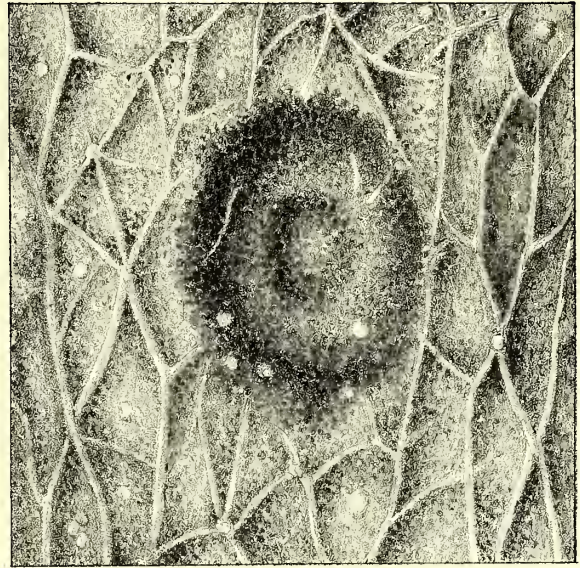
Fig. 7. The rete mucosum of the duck's foot spread upon glass, magnified 100 diameters.



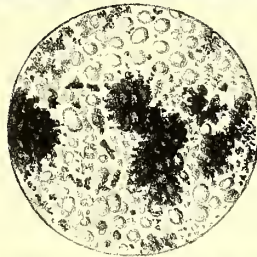
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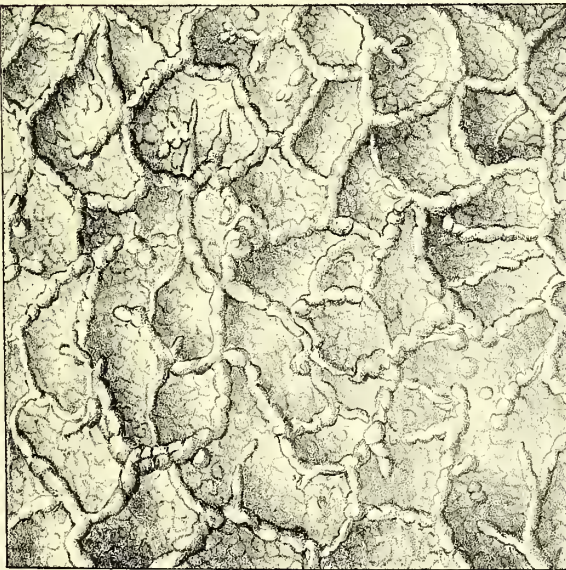
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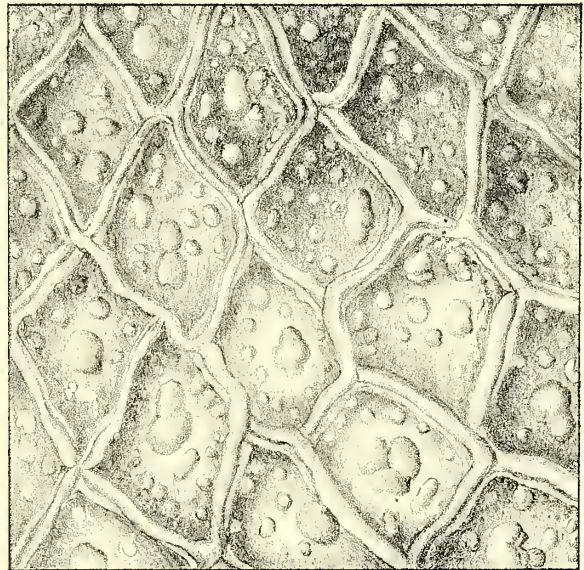
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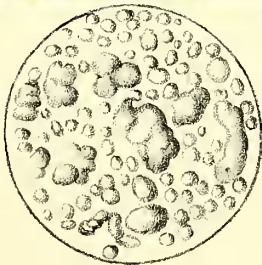
4



6



5



7







## PLATE XLI.

HAIR forms a CUTICULAR TUBE, lined with RETE MUCOSUM, and gives a passage like the pores of the skin to a limpid fluid, in some instances very abundant, in others small in quantity: this is not oil, as is generally believed to be the case in the wool of the Negro.

This plate consists of four figures.

Fig. 1. The hair from an infant.

One hair is seen in an opaque state, the others are transparent.

Fig. 2. Hair from a child four years old.

A single hair is seen opaque, the others transparent.

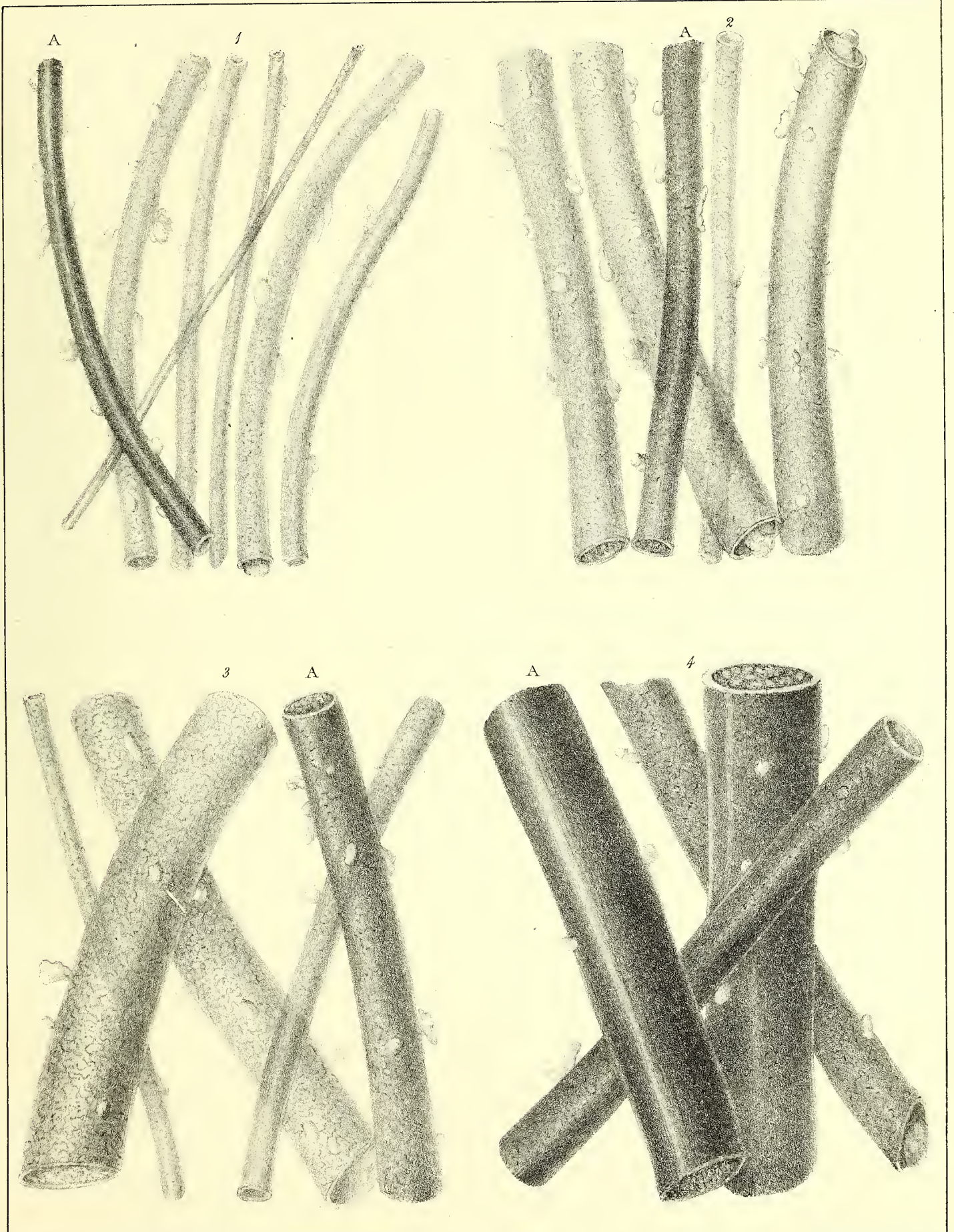
Fig. 3. Hair from a woman twenty-five years old.

One hair is seen opaque, the others transparent.

Fig. 4. Hair of a Portuguese man thirty years old. It is darker and has more consistence than the others.

One is seen opaque, the others are transparent.

These figures are magnified 200 times.







## PLATE XLII.

HAIR grown grey, the consequence of the RETE MUCOSUM, with which it is lined, separating from the CUTICULAR COVERING, and leaving the tube devoid of colour.

Fig. 1. Hair from a man of sixty years of age. In those that have become grey, the rete mucosum has separated from the cuticular tube forming the hair, and is seen loose in the cavity : one is seen in an opaque state, the others are transparent.

Fig. 2. Hairs from a Negro above sixty years of age ; some are grey.

In some of them the tube has burst, and the external cuticular covering is split into a kind of fringe : all the hairs are shown transparent ; one retains its black colour.

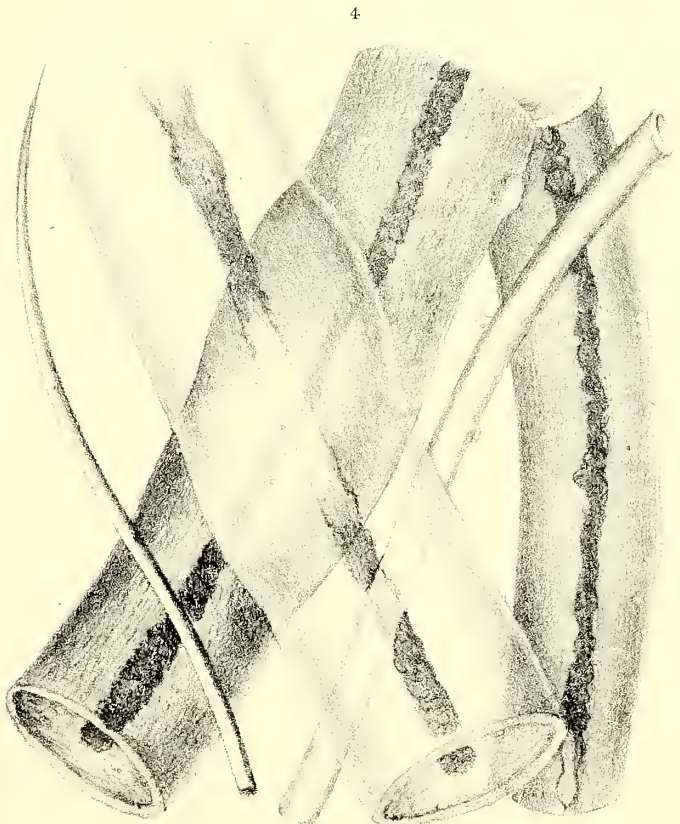
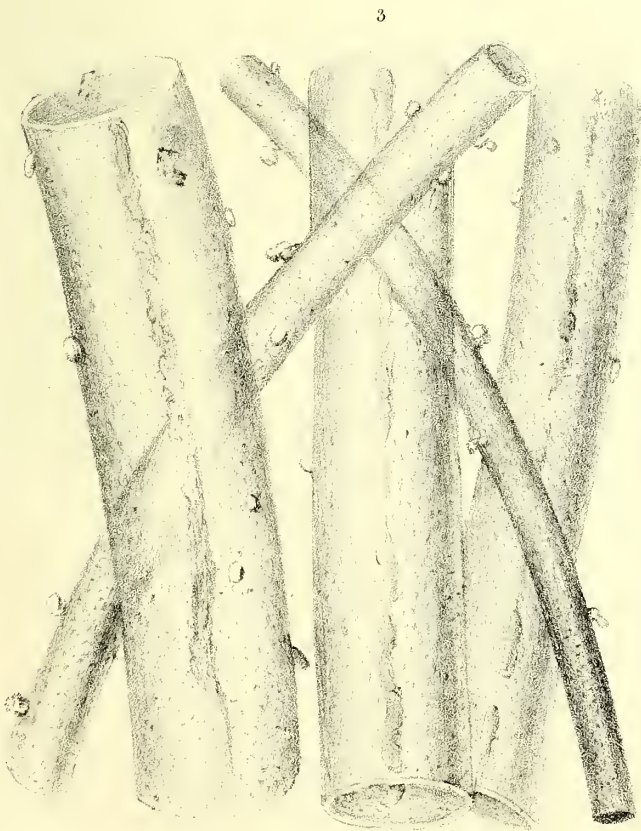
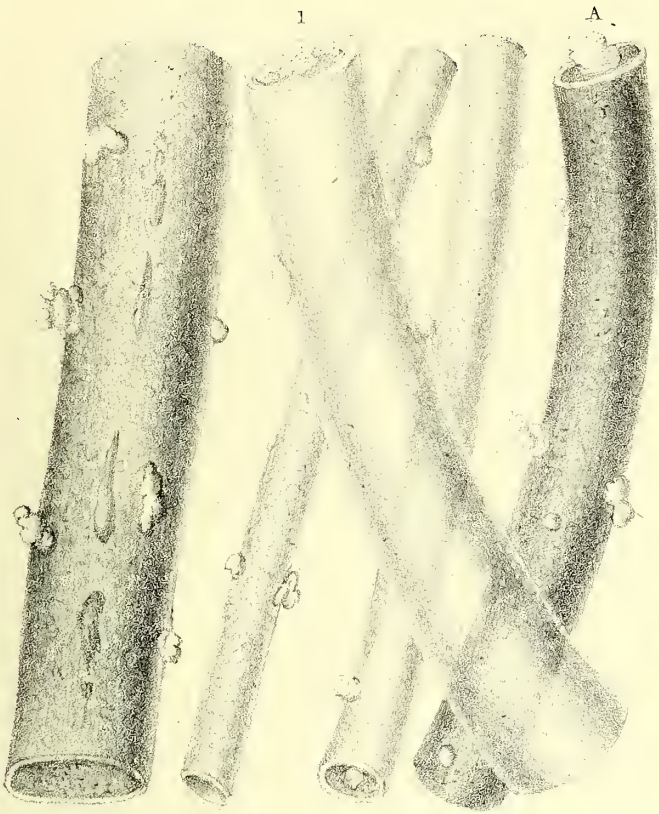
Fig. 3. Hair from a Chelsea pensioner, 106 years old : in the centre of the tube the remains of rete mucosum are visible.

All the preceding specimens are taken from the head.

Fig. 4. Hairs taken from the whiskers of a man sixty years of age : some of them are fair, others are grey.

There is less exudation from whiskers than from the hair of the head.

All the figures are magnified 200 times.







## PLATE XLIII.

The OVA of the OYSTER represented in the OVARIUM, in which they are not only formed, but also impregnated.

This plate contains four figures.

Fig. 1. The convex shell to identify the species, which is the common edible oyster.

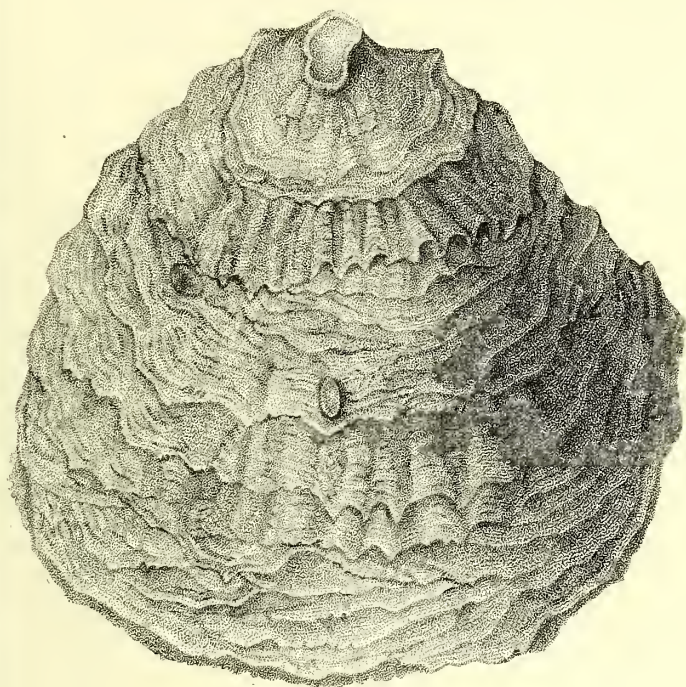
Fig. 2. The oyster lying upon the flat shell, to show the body of the animal with its cloak.

Fig. 3. The cloak and one layer of the gills are removed to expose the ovarium and oviduct : a slice from the surface of the ovarium is removed to show the ova.

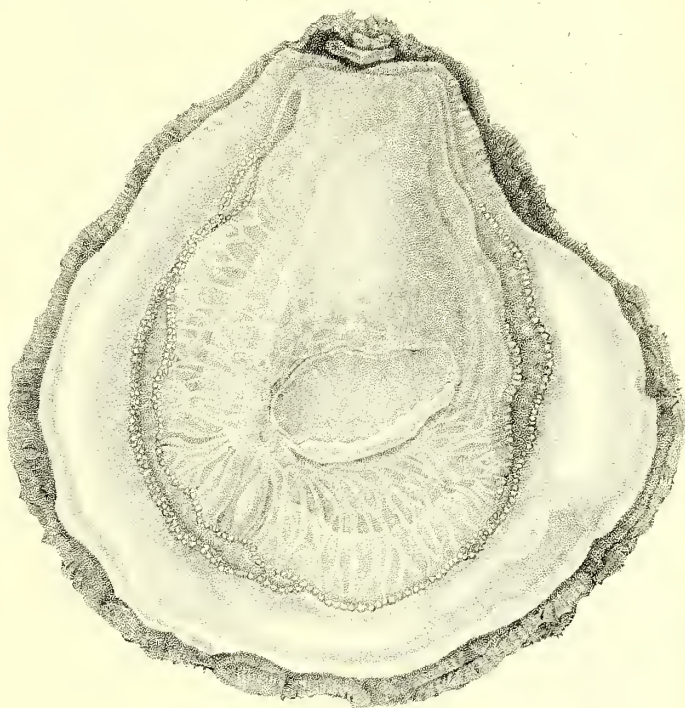
Fig. 4. An oyster in the act of emitting the young, enveloped in a purple-coloured mucus.

All the figures are of the natural size.

1.



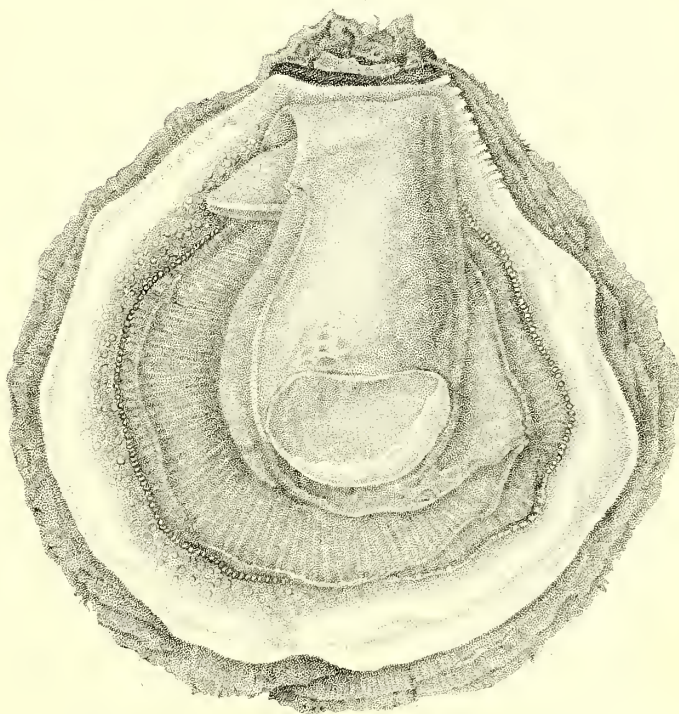
2.



3.



4.









## PLATE XLIV.

The FORMATION of the YOUNG OYSTERS in the OVA, after  
they have left the ovarium, and got into the oviduct.

In this plate there are ten figures.

Fig. 1. A perpendicular section of an oyster, to exhibit the course of the alimentary canal, the oviduct, and the heart, magnified two diameters.

Fig. 2. A very small portion of the ovarium and the ova, contained in its substance, magnified 100 times.

Fig. 3. Some ova extracted, and shown as they appear floating in water, assuming a globular form, one of the ova at *a*, when it had been an hour in water, dissolved into a granulated mass, magnified 100 times.

Fig. 4. An ovum more advanced, magnified in the same degree.

Fig. 5. Some ova from the same portion, magnified 100 times, dissolved, and emitting their granulated contents, *b*, an abortive ovum.

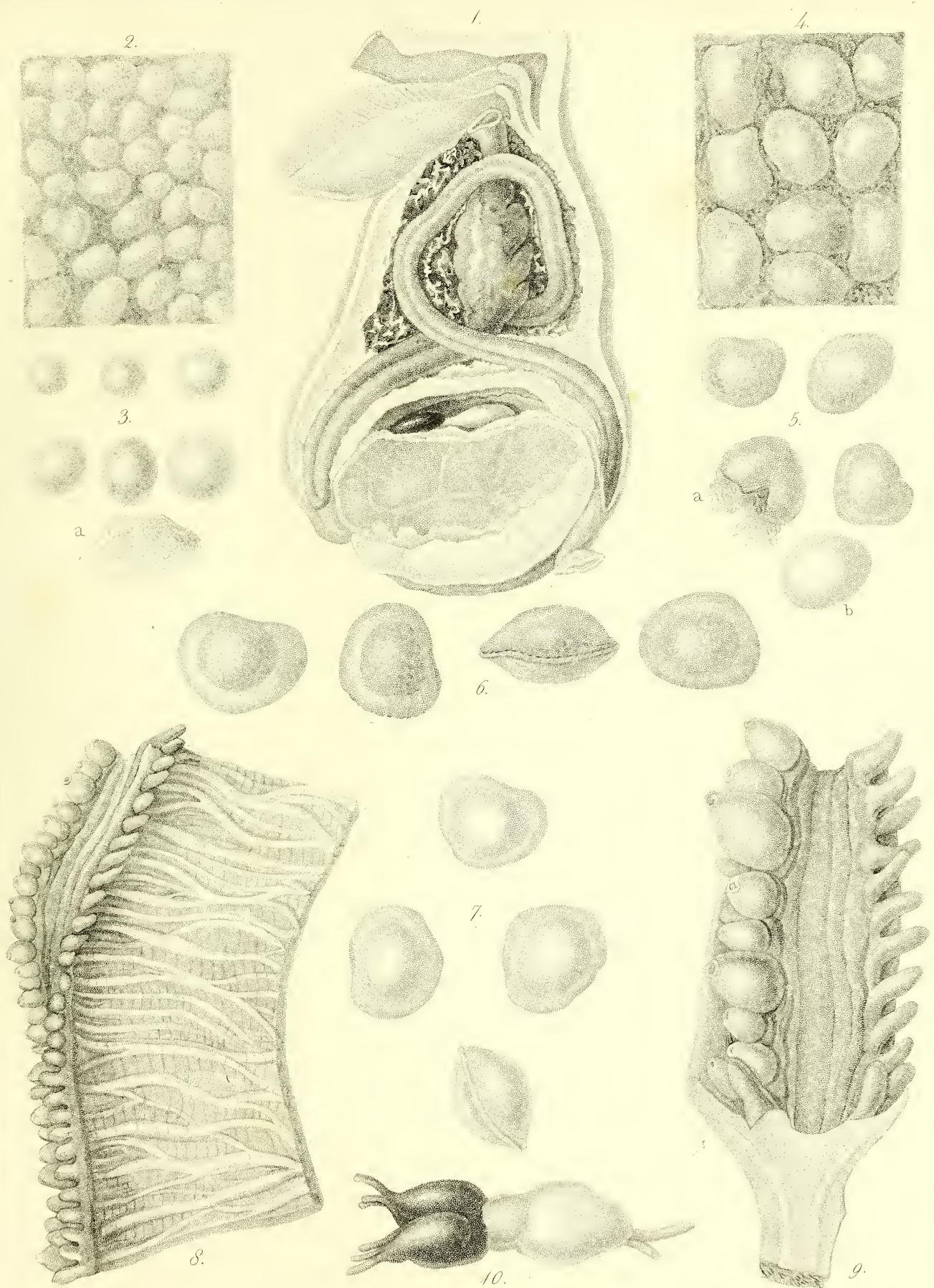
Fig. 6. Several young oysters just escaped from the oviduct, floating in water, magnified 100 times.

Fig. 7. Young oysters exposed to the air becoming opaque and glossy, magnified 100 times.

Fig. 8. A small portion of the cloak with its fringe, magnified twenty-five times.

Fig. 9. The fringe spread open, magnified fifty diameters.

Fig. 10. The heart, magnified four diameters.







## PLATE XLV,

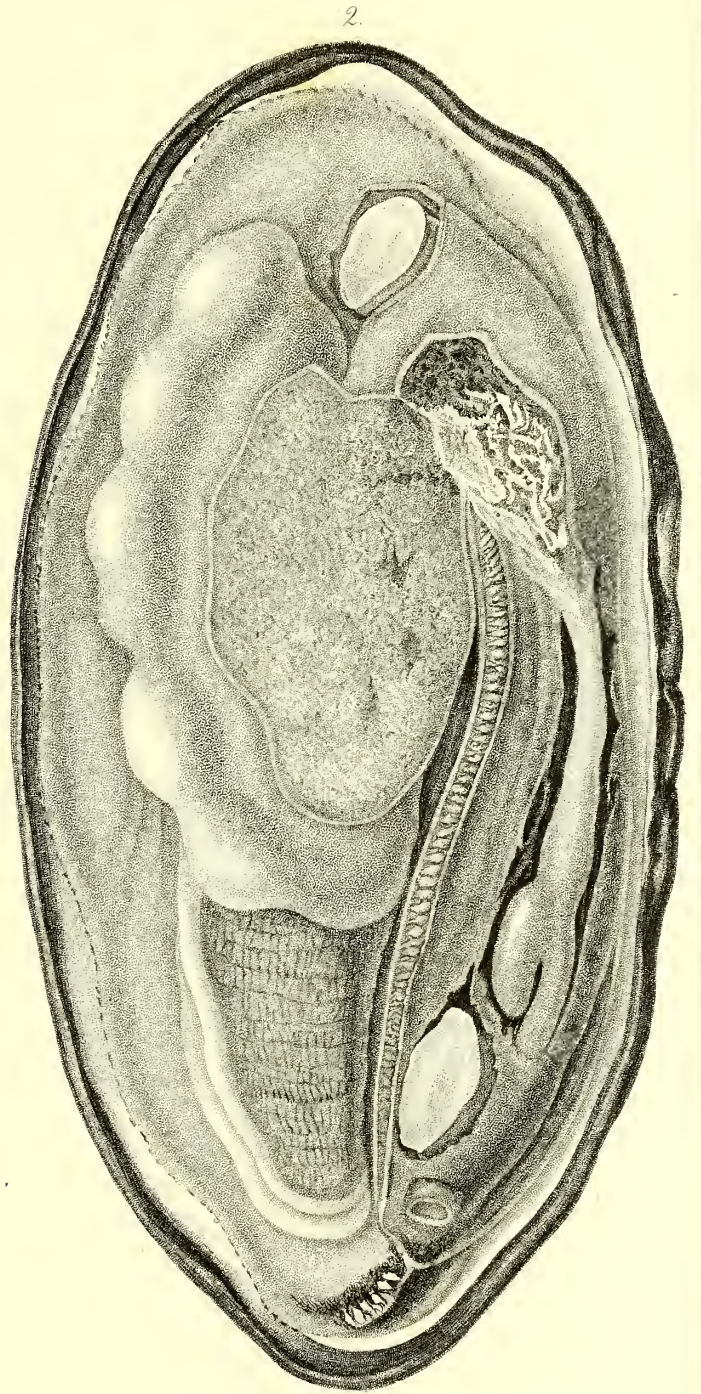
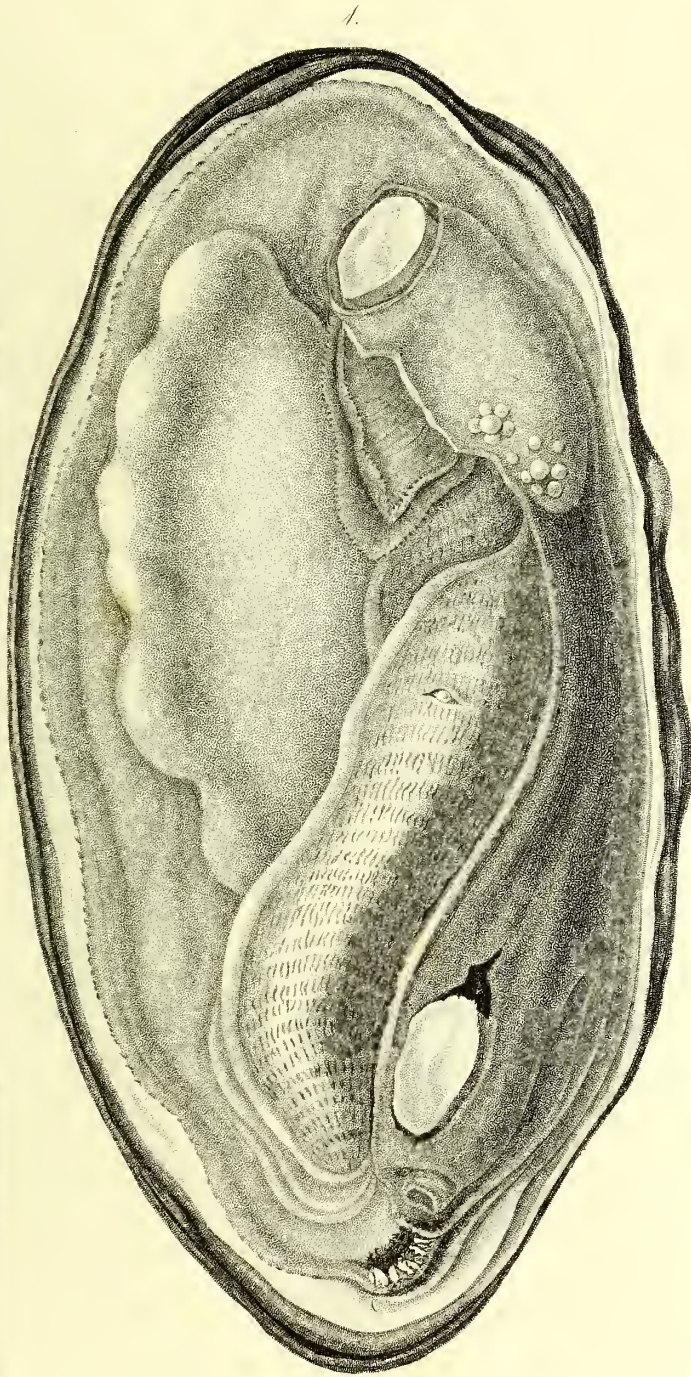
The OVA of the FRESH-WATER MUSCLE represented in the  
OVARIUM, where they remain till after impregnation has  
taken place.

This plate consists of two figures.

Fig. 1. A fresh-water muscle of the natural size, from which one shell is removed, so as to expose the ovarium and the oviduct.

Fig. 2. The same muscle, the oviduct having been removed, and a perpendicular section having been made through the ovarium ; of the natural size.











## PLATE XLVI.

YOUNG MUSCLES represented in the course of their passage  
along the OVIDUCT.

This plate consists of eight figures.

Fig. 1. A small portion of the ovarium, with the ova imbedded in a yellow granular substance, magnified 100 diameters.

Fig. 2. A transverse section of a portion of the oviduct, magnified two diameters.

Fig. 3. A portion of the canal of the oviduct exposed, some ova ready for emission, magnified 20 diameters.

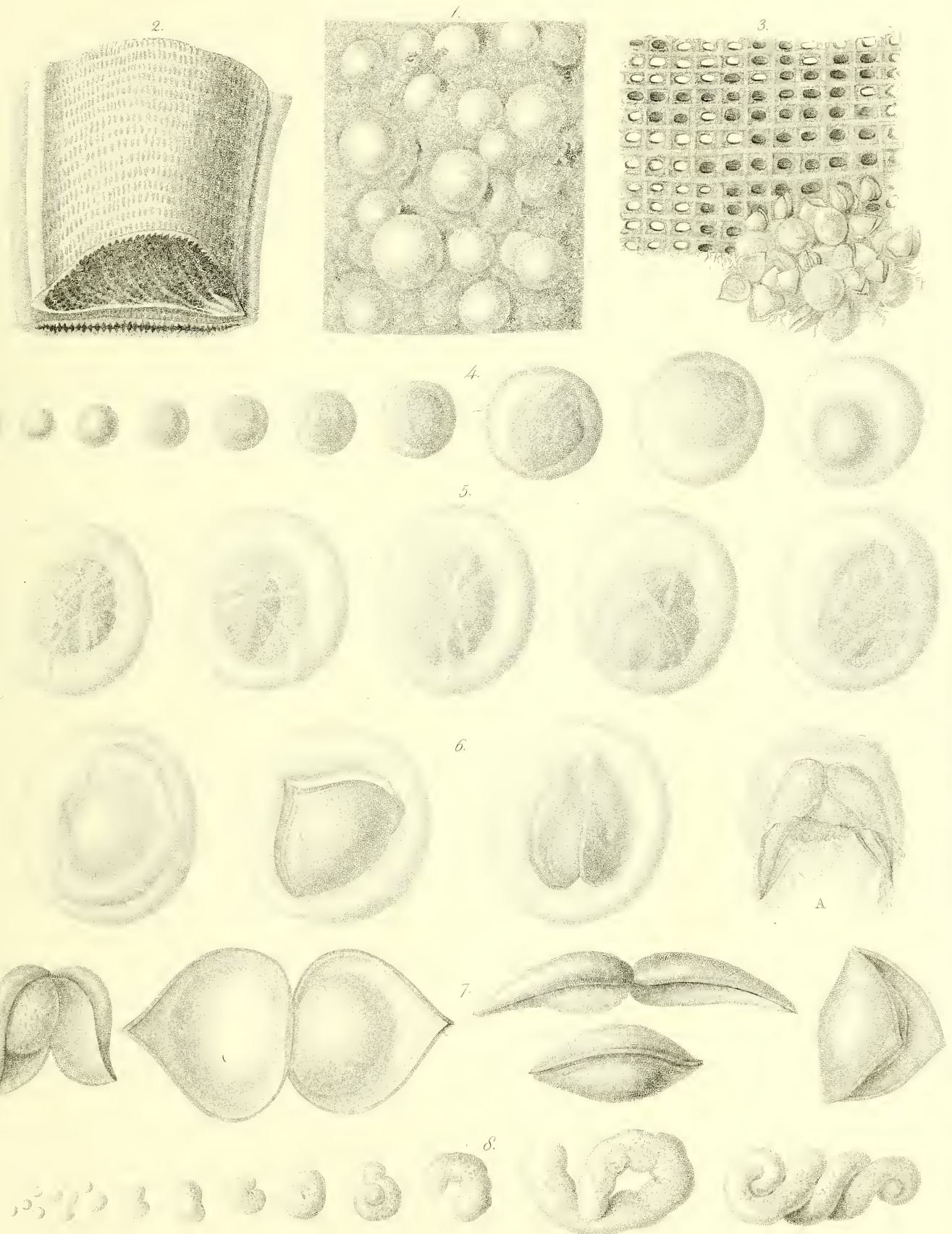
Fig. 4. Ova from the ovarium, of different sizes, magnified 100 diameters.

Fig. 5. The young in an early stage, extracted from the oviduct, magnified 100 diameters.

Fig. 6. Ova ready for expulsion at *a*: one is bursting its vesicle or inclosing membrane; magnified 100 diameters.

Fig. 7. Young muscles, after being expelled, very lively, opening and shutting their shells.

Fig. 8. The origin and progress of a worm found in the oviduct of the muscle, distinguished by a rotatory motion, which it continues till completely formed: it sometimes becomes an inch long; magnified 100 diameters.







## PLATE XLVII.

FORMATION of PEARLS in the FRESH-WATER MUSCLE, which  
is found in the tanks or reservoirs for water from the  
Thames at Chelsea Hospital.

This plate contains five figures.

Fig. 1. A fresh-water muscle, one of the shells of which is removed; of the natural size.

A cluster of small pearls lying on the outer surface of the ovarium, close to the liver.

Fig. 2. The above pearls magnified three diameters, attached to the membrane on which they lie.

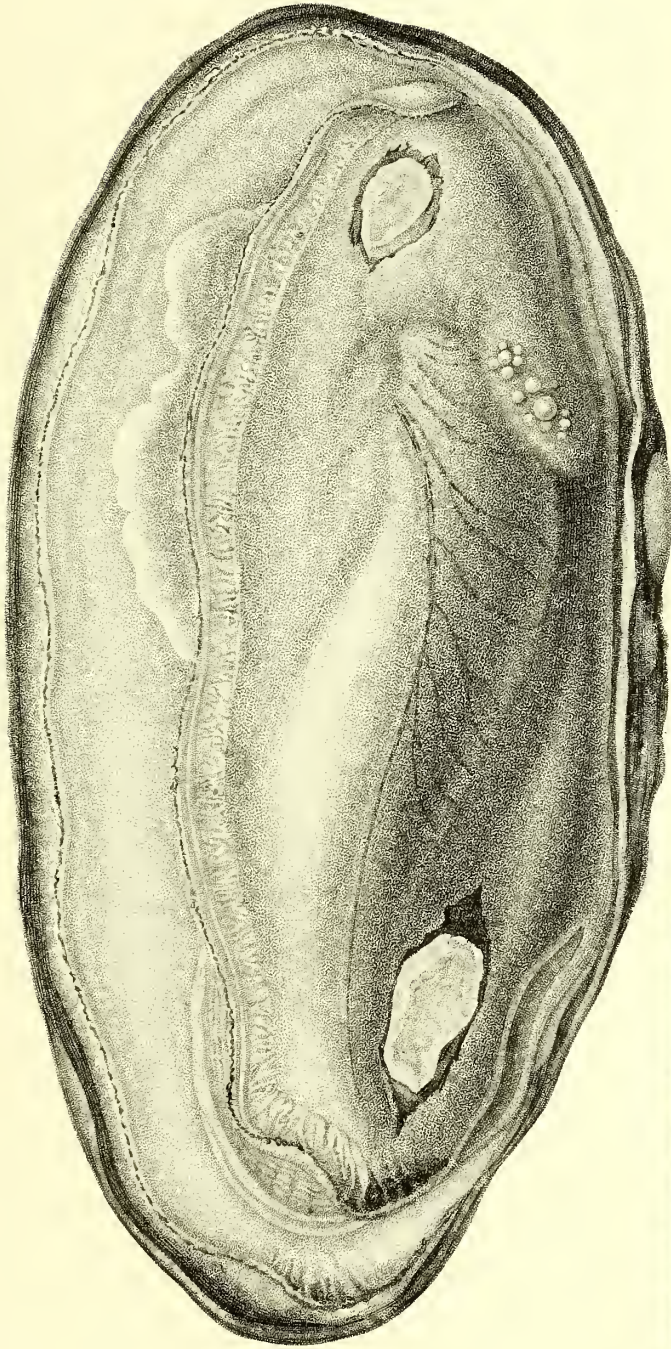
Fig. 3. A pearl bursting the vesicle or bag of the ovum, magnified five diameters.

Fig. 4. A pearl escaping from the vesicle, magnified five diameters.

Fig. 5. A section of fig. 4. magnified ten diameters, to show its central cell.

Fig. 6. Section of an oriental pearl, magnified ten diameters, in which the central cell, or the cavity in which the abortive ovum was contained, is conspicuously seen.

Fig. 1.



2.



3.



4.



5.



6.







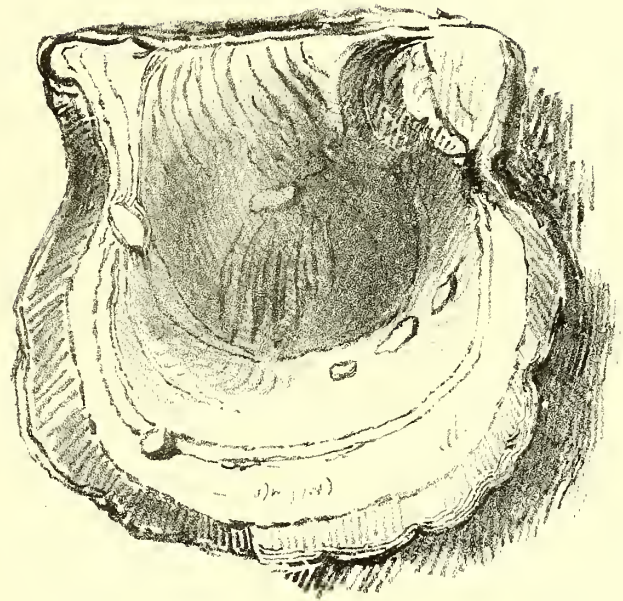
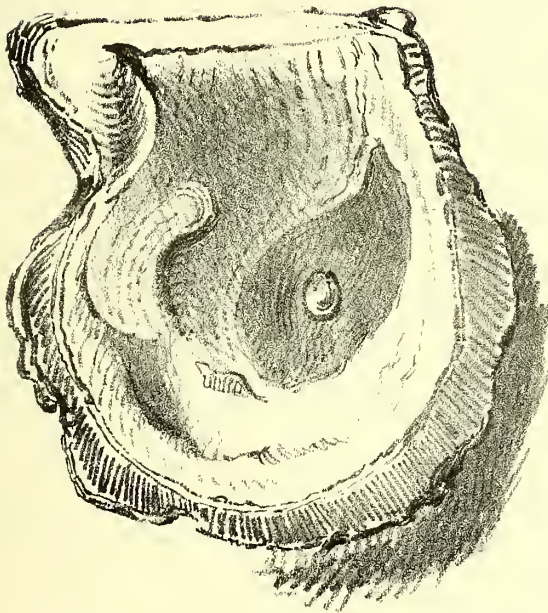
## PLATE XLVIII.

The SHELLS of the CEYLON OYSTER, to show the superior lustre of the nacre with which they are coated, are represented in this plate; also sections of oriental pearls, and of Chinese artificial pearls.

In this plate are represented an upper and under shell of the oyster, from Ceylon.

Three specimens of sections of pearls, to show the central cavity, and the degree of transparency of the layers of which the pearl is composed.

Specimens of hemispheres turned from the shell of the chema, and introduced through the shell of the oyster, for the formation of artificial pearls, or rather half pearls, manufactured by the Chinese to pass them off for genuine pearls, from which they are readily distinguished, by the want of lustre, there being no splendid central cavity.







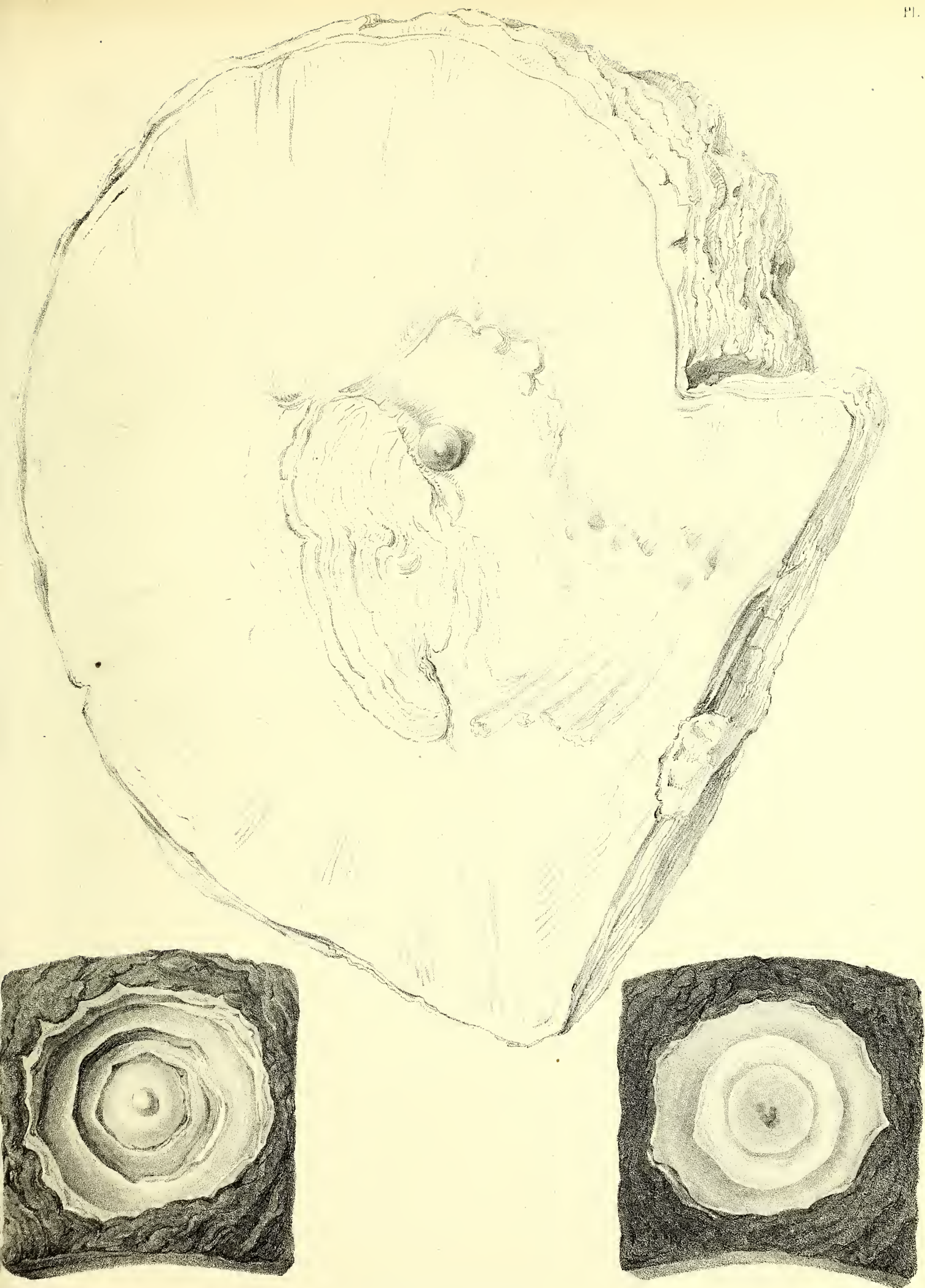
**PLATE XLIX.**

**A MALACCA OYSTER SHELL, and a large pearl imbedded in its  
substance.**

In this plate are represented the two sides of an imbedded pearl.

One, that had been exposed, the other, imbedded.

The shell is of the natural size.







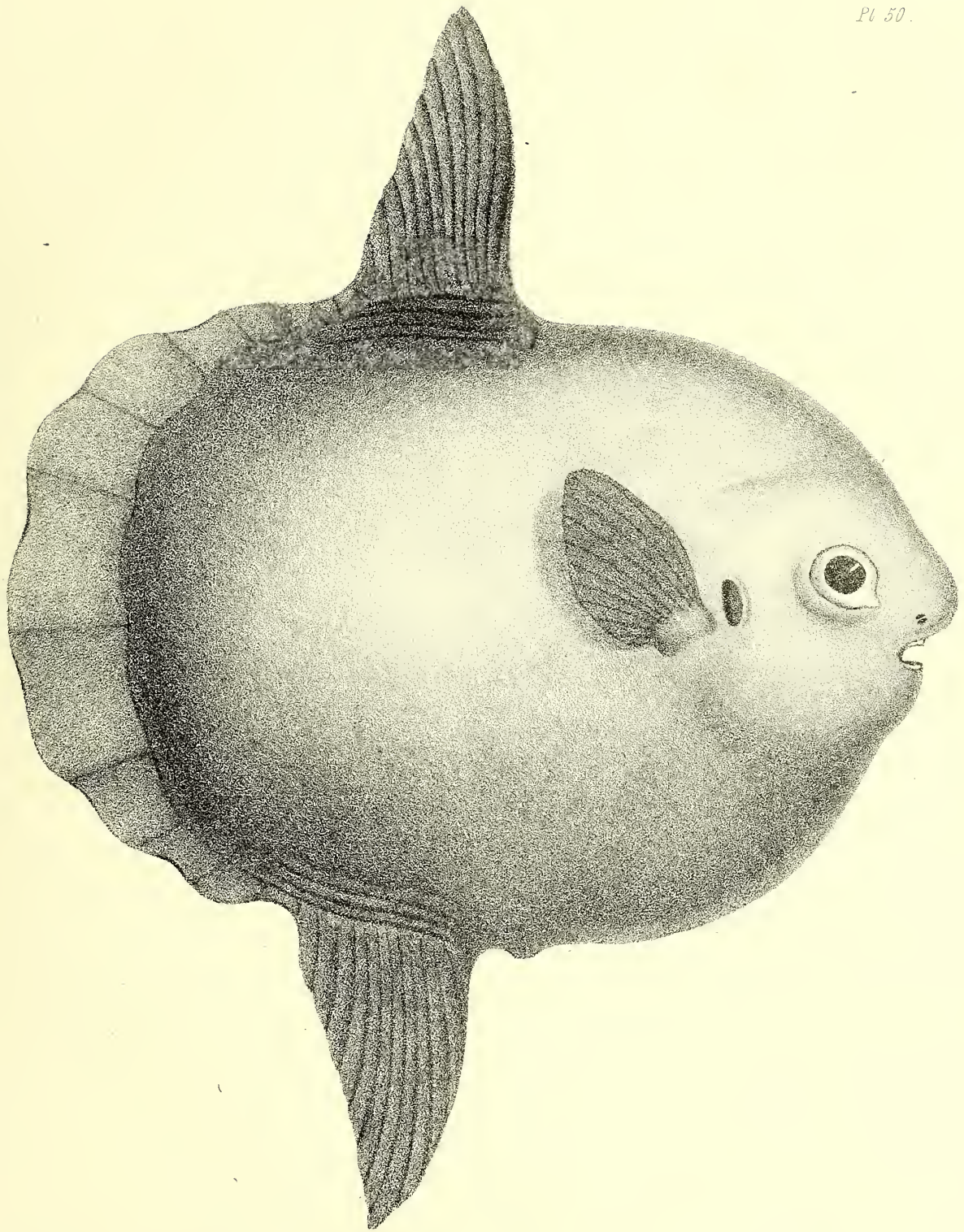
## PLATE L.

This plate represents the external form of the TETRADON  
MOLA, or short sun-fish.

Its external form is very extraordinary, and on that account a figure of it is here given.

This fish has been met with ten feet long, and weighing 500 pounds.

The specimen from which the ovarium, represented in the annexed plate, is taken, was caught upon the coast of Africa, near the Cape of Good Hope.



*Wilhelmina King del. W. Walton Lithog.*

*Daniel MacKenzie sc.*

TETRAODON MOLA.

*Printed, by C. Hullmandel.*





## PLATE LI.

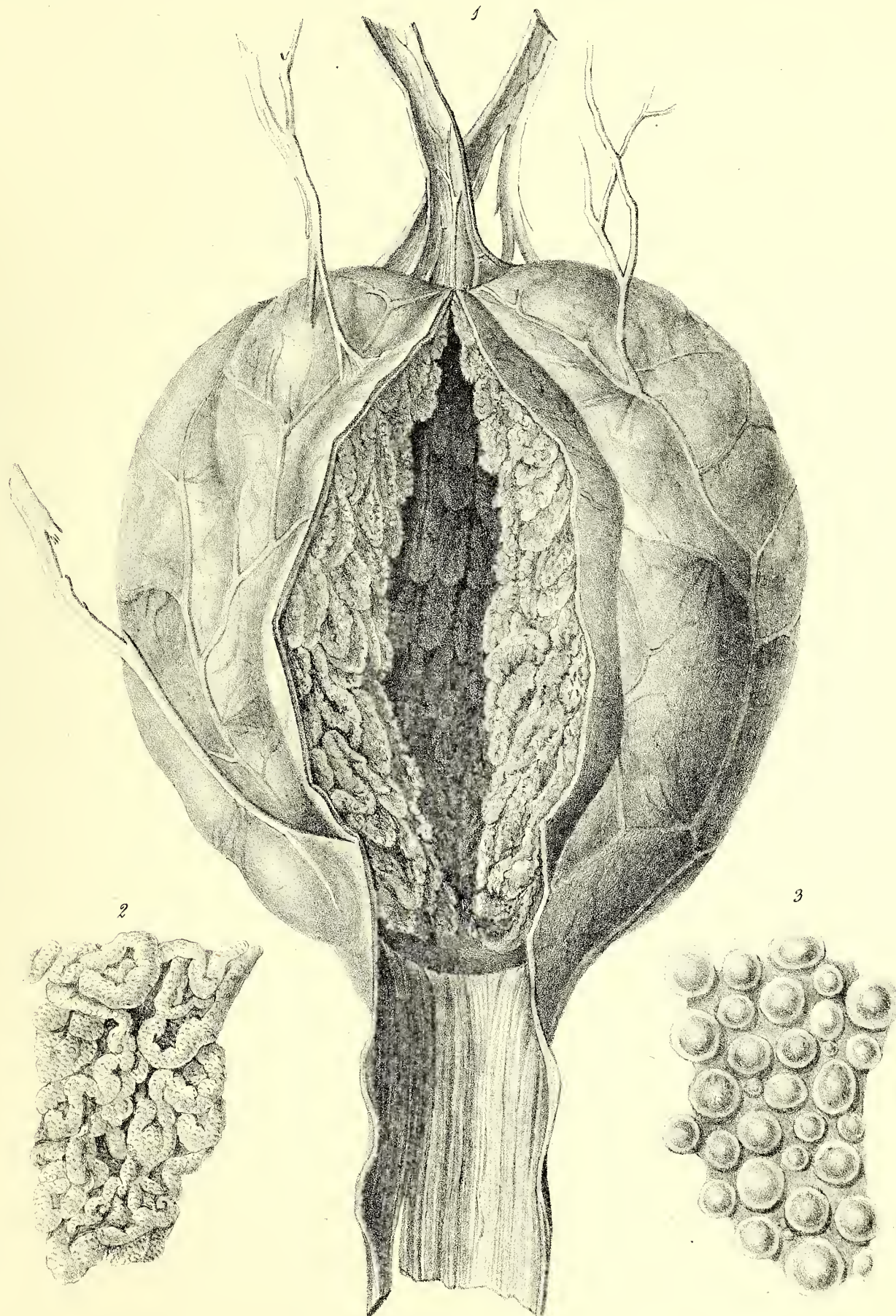
The OVARIUM taken from the TETRADON MOLA, to show its structure.

As the ovarium was taken out of the fish at sea, and was the only part preserved, it cannot be ascertained whether the whole was removed; but there is every reason to believe so, since there is no appearance of mutilation upon the external surface.

Fig. 1. The ovarium laid open to show the parts contained in it; natural size.

Fig. 2. A small portion of the clusters of ova, magnified ten diameters.

Fig. 3. A small portion of fig. 2. magnified 100 diameters.







*On the Organs of Generation, and the Mode of breeding of  
the Cobitis Anableps.*

A DESCRIPTION of the eye of this curious fish has a place in the fifth volume, and is illustrated by one of the engravings in the present. The specimens from which that description was taken, were not in a state to admit of an accurate examination of the organs of generation; but since that volume has been printed off, I have received specimens, through my friend, Dr. Muttlebury, sent me by the kindness of Dr. Austin, from Demerara, in which these parts are uninjured. I shall, therefore, in this place, give a description of them illustrated by engravings.

In the male there is a spine, apparently belonging to the anal fin, which distinguishes it from the female. Immediately behind this spine, there is a duct or canal leading from the testicles, contained within the belly, and opening externally close to the point of the spine, making it evident that the spine and this duct form the penis, which in the act of copulation is introduced into the female organs, and the ova are impregnated before they leave the ovaria. The orifice in the female, into which this penis is introduced, is situated at some distance below the vent, between it and the anal fin, and leads to a canal that passes up to the ovaria.

This structure of parts is different from that met with in the organs of generation in any other fishes, nor does it

*On the Organs of Generation, &c.*

exactly correspond with what is found in any of the cold-blooded animals.

The ova pass out after impregnation by the vagina or duct which has been mentioned.

The *Anableps* feeds upon its own species, which accounts for young ones being very frequently found in the stomach of those caught for the use of the table; and, from this circumstance, an idea became general, that the *Anableps* was viviparous, or, at any rate, oviparous, since the small fishes were supposed to be lodged in the oviduct, not in the stomach.

This error is adopted both by Bloche and Lacepede, no one having accurately examined the organs of generation.

The young fishes are swallowed both by the male and female as an article of food, and the skin, or external covering of those that are thus devoured, being composed of a strong scaly cuticle, it is not digested in the stomach, and is voided with the excrement.

The internal organs of generation are placed on the sides of the rectum, and are extended beyond the termination of that gut, so that they open externally by separate orifices, which is a peculiarity not met with in other fishes.

## PLATE LII.

The MALE ORGANS of GENERATION of the COBITIS ANABLEPS.

This plate contains nine figures.

Fig. 1. A side view of the fish, to show the external appearance of the male organs, which consist of the duct leading from the testicles, and the cartilaginous spine on which it is supported.

Fig. 2. The cavity of the abdomen laid open, exposing the stomach, containing nine small fishes which had been swallowed.

Both of these figures the natural size.

Fig. 3. The internal male organs exposed, showing the testicles in situ, and the urinary bladder. The cartilaginous spine, when dissected, is made up of rays like a fin, one of which is longer than the rest, and projects beyond the others.

Fig. 4, 5, and 6. show the teeth, which are not only placed in the jaws, as in fig. 4., but also in the palate, as in fig. 5., and in the roots of the gills, as in fig. 6.

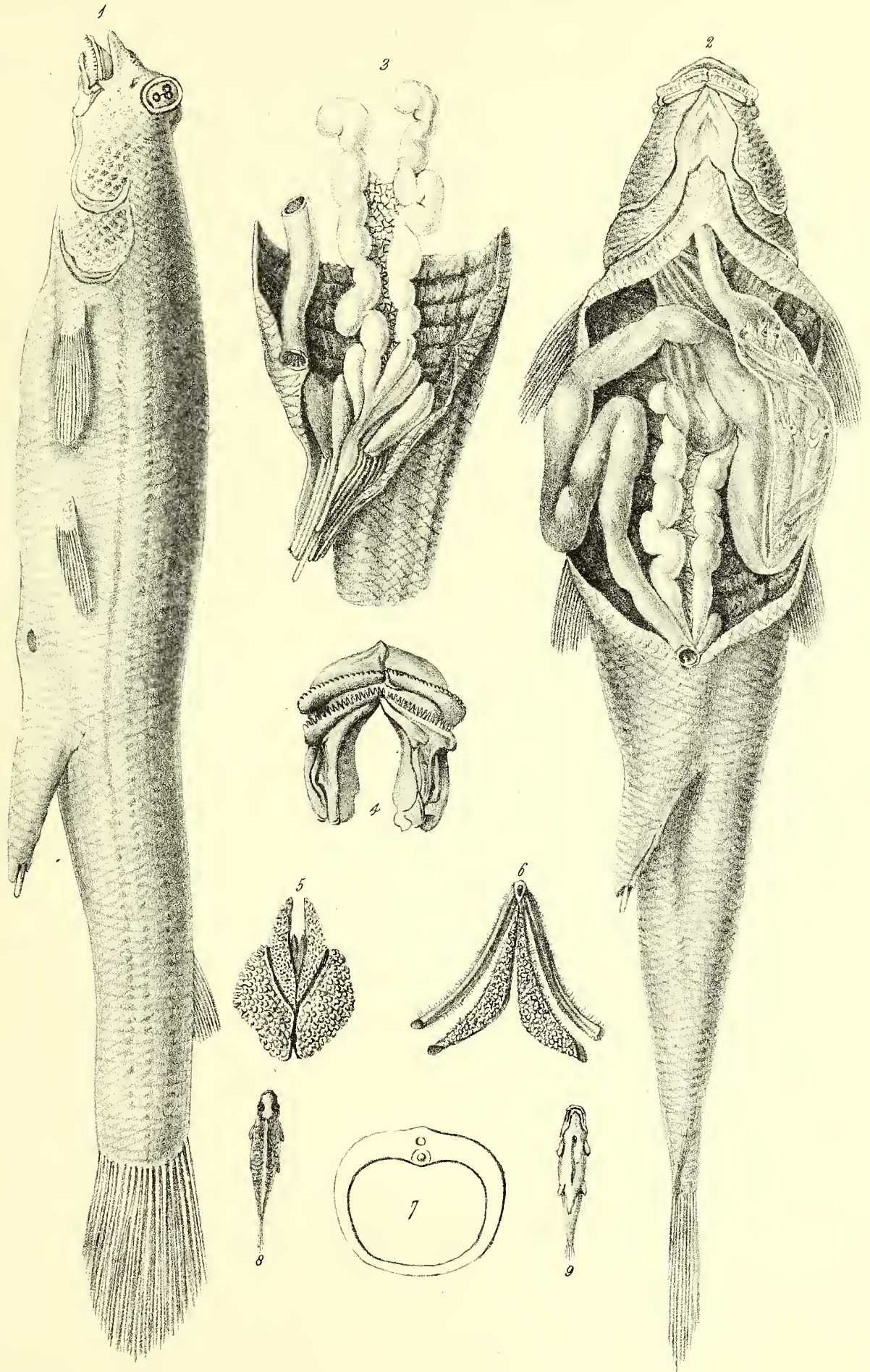
These figures are magnified two diameters.

Fig. 7. A section of the body of the fish, to show its form, natural size.

Fig. 8. A back view of one of the fishes, taken from the stomach.

Fig. 9. A belly view of the same fish, showing that the parietes of the abdomen are not completely formed ; both figures natural size.







## PLATE LIII.

This Plate represents the FEMALE ORGANS of GENERATION  
in the COBITIS ANABLEPS.

This fish is said not to exceed in length seven inches ;  
but the specimens represented are longer, and one in my  
possession is ten inches.

In this plate are seven figures.

Fig. 1. A side view of the fish, to show the orifice leading to the ovarium : it is situated between the vent and the anal fin.

Fig. 2. The same fish laid open from the gills to the vent.

The liver is turned aside to show the stomach, through the coats of which is seen a young fish that had been swallowed. The course of the intestine is traced to the anus.

The ovaria are seen in situ.

Fig. 3. The ovaria are exposed as low as the orifice of the oviduct ; the rectum and anus are turned aside.

The spermatic vessels that go to the ovarium are shown.

These three figures are of the natural size.

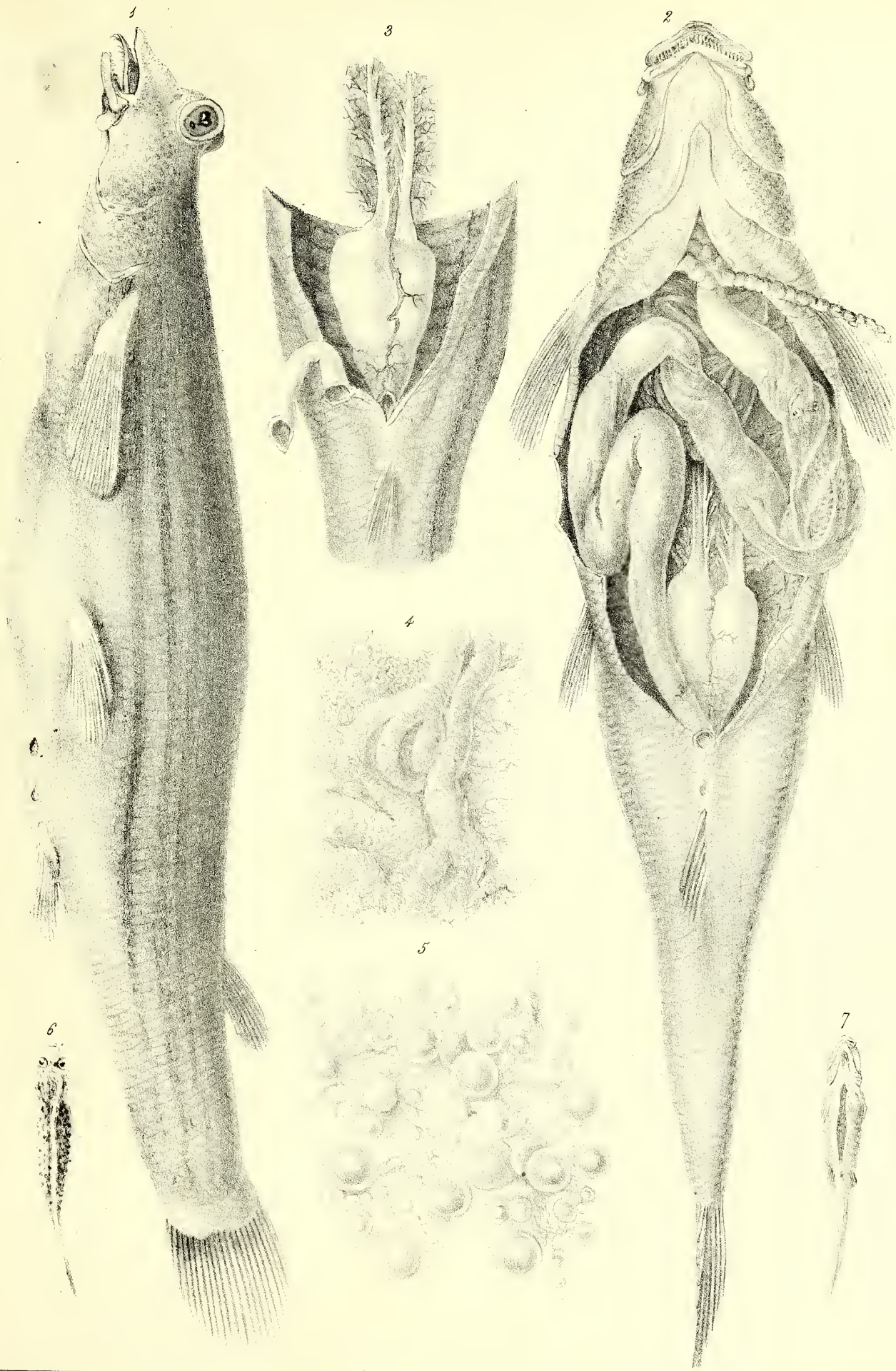
Fig. 4. A small portion of the internal structure of the ovarium, magnified ten diameters.

Fig. 5. The ova, having an incipient yelk, magnified 100 diameters.

Fig. 6. A back view of one of the fishes taken from the stomach, natural size.

Fig. 7. A belly view of the same, to show that the parietes of the thorax and abdomen are not completely formed ; natural size.







## PLATE LIV.

This Plate represents the OVA of the FROG deposited in two large reservoirs near the termination of the oviducts, in which they remain till they are completely formed, and in a state fitted for impregnation.

This plate contains eleven figures.

Fig. 1. A female frog just ready to spawn, natural size.

Fig. 2. The ovaria and oviducts.

Fig. 3. Ova of different sizes taken from the oviduct, magnified five diameters.

Fig. 4. Ova from the upper part of the oviduct, magnified five diameters.

Fig. 5. Ova from the dilated part of the oviduct, natural size. A B, two ova that had been in water a few minutes, to show the expansion that takes place in the jelly, magnified five diameters.

Fig. 6. An ovum, the jelly removed, magnified ten diameters.

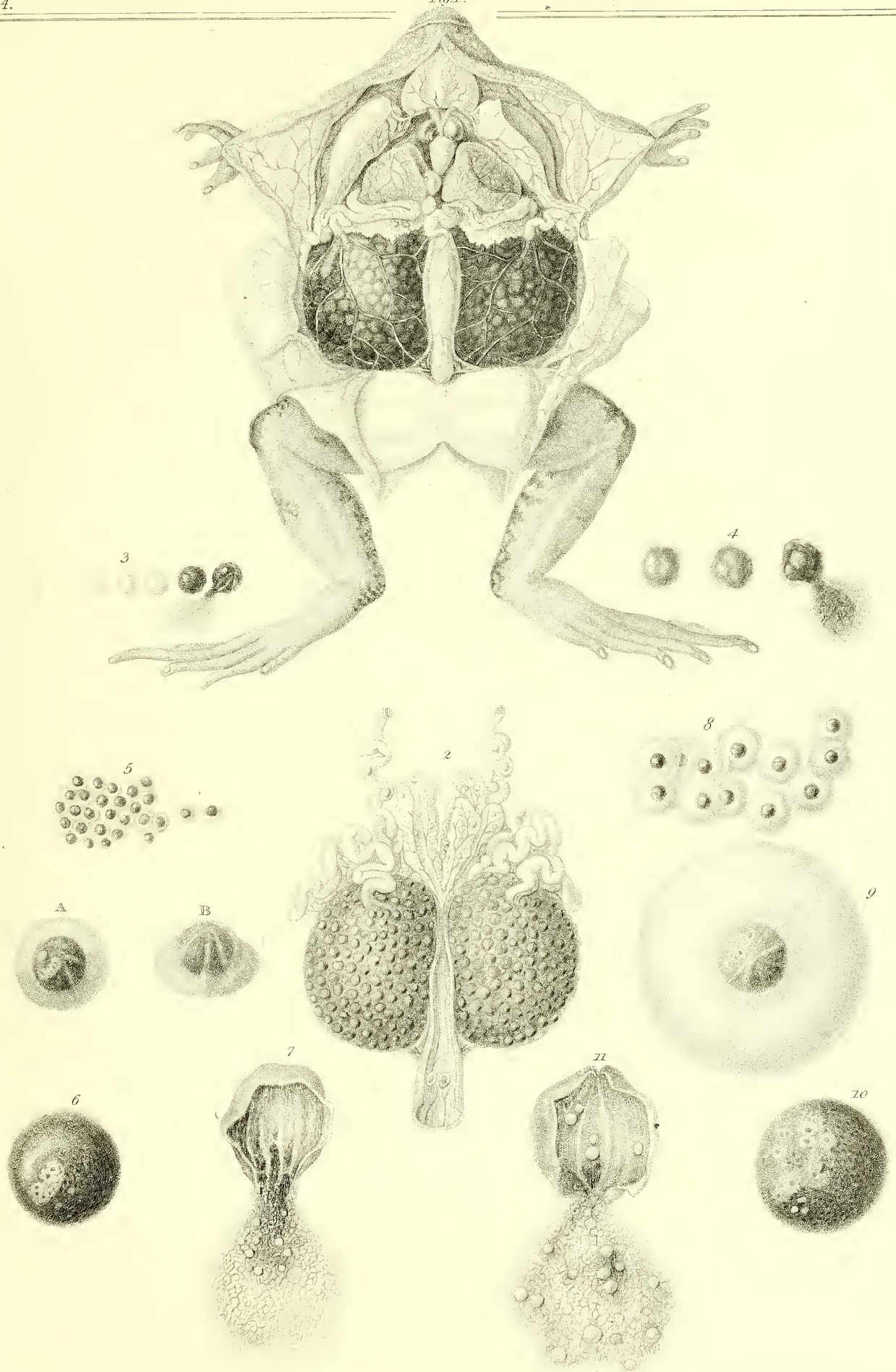
Fig. 7. The same ovum opened to show its contents, magnified ten diameters.

Fig. 8. Ova immersed in water fourteen days, natural size.

Fig. 9. The same ovum magnified ten diameters.

Fig. 10. The same ovum opened, magnified ten diameters ; its contents consist of oil.







## PLATE LV.

In this Plate is represented the progress of the formation of  
the TADPOLE within the OVUM of the FROG.

This plate contains six figures.

Fig. 1. Ova six hours after being spawned, natural size : *a*, one of these magnified five diameters ; *b*, the same magnified ten diameters ; *c*, longitudinal section, its contents half coagulated, magnified ten diameters.

The progress of the ova is contrasted with one not impregnated, marked with a star at the top of each cluster.

Fig. 2. The cluster at twelve hours, one ovum magnified five, one ten diameters ; also a longitudinal section magnified ten diameters.

Fig. 3. An ovum twenty-four hours after being spawned.

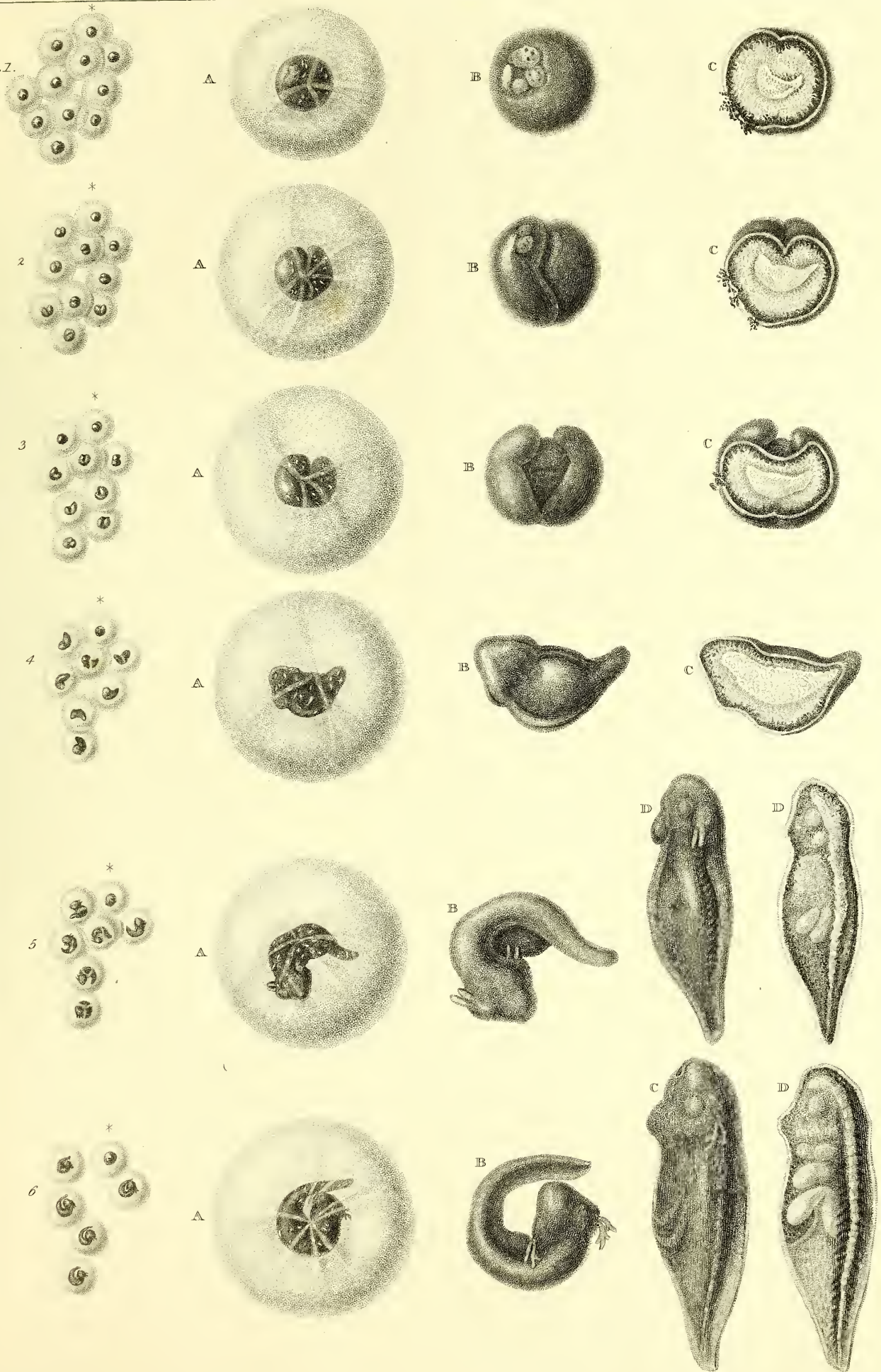
Fig. 4. An ovum thirty-six hours after being spawned.

Fig. 5. An ovum three days after being spawned.

Fig. 6. An ovum four days after being spawned.



Fig. 1.





## PLATE LVI.

In this Plate is represented the progress of the formation  
of the different organs in the TADPOLE.

This plate contains four figures.

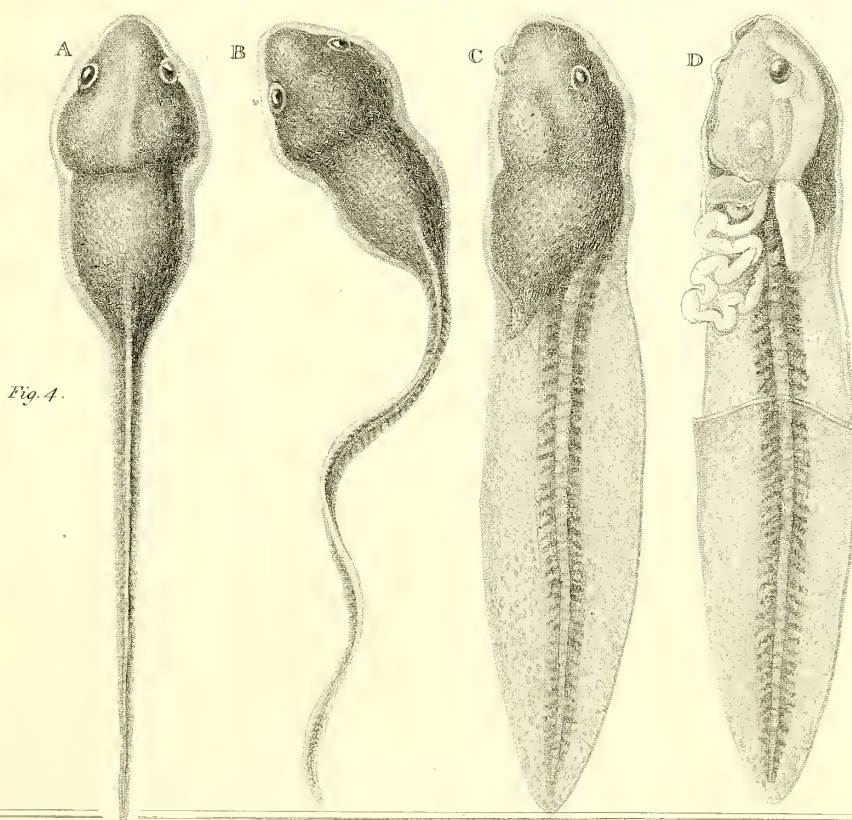
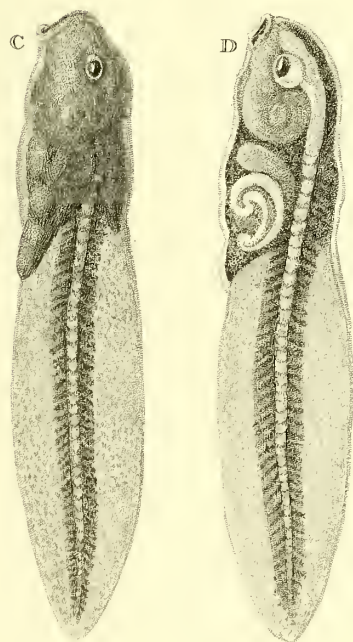
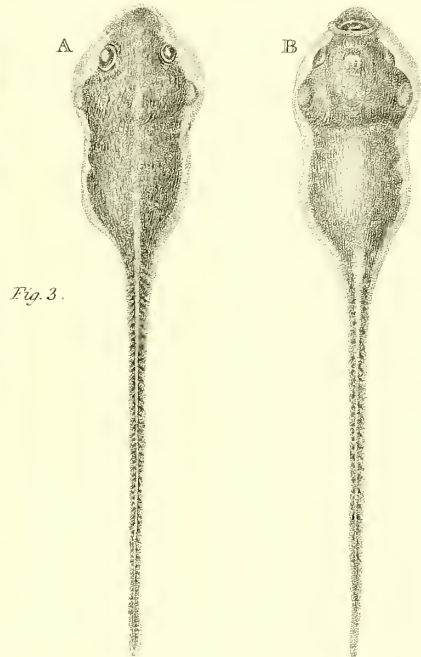
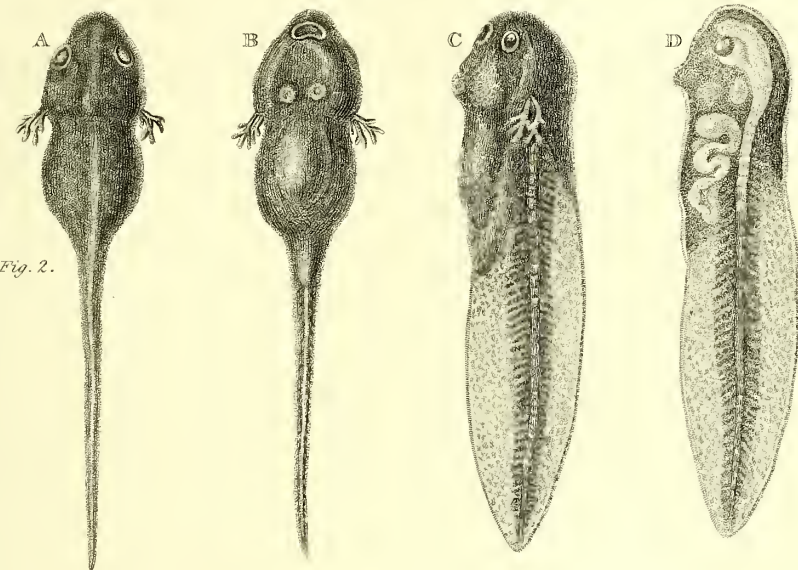
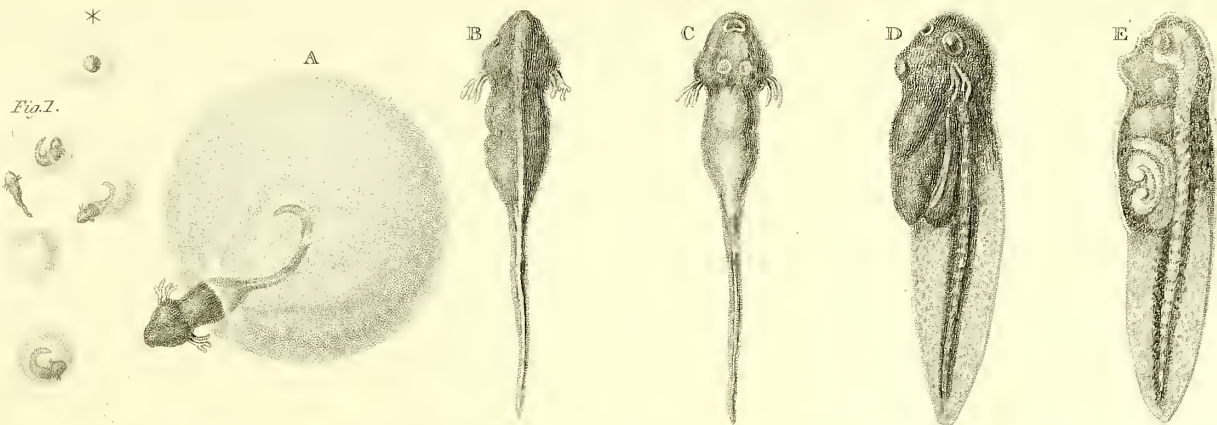
Fig. 1. A tadpole extricating itself from an ovum, five days after being spawned, magnified five diameters. B, the back view. C, belly view. D, side view. E, longitudinal section.

Fig. 2. A tadpole six days after being spawned.

Fig. 3. A tadpole eight days after being spawned.

Fig. 4. A tadpole twelve days. All magnified eight diameters.







## PLATE LVII.

This Plate represents the external appearance of the MALE  
and FEMALE ORGANS of GENERATION in the AMERICAN  
PROTEUS.

Fig. 1. The external parts of generation in the male are represented.

Fig. 2. The female external parts of generation are shown.

It is a remarkable circumstance, that the external orifice in the female is smaller than in the male.



Fig. 1.

Fig. 2.





**PLATE LVIII.**

The MALE ORGANS of the MEXICAN PROTEUS.

In this plate the male organs are seen in different degrees of development.

Fig. 1. The male proteus laid open, the heart, lungs, and gills are exposed in situ, also the organs of generation.

Fig. 2. The male organs magnified two diameters.

*a, a.* The plicæ at the external orifice.

*b.* Urinary bladder.

*c, c.* Vesiculæ seminales.

*d, d.* Cowper's glands.

*e, e.* Testicles.

Fig. 3. The external orifice expanded, magnified two diameters.

Fig. 4. The testicles, and a fatty substance lying on each side of the spine, magnified two diameters.

Fig. 5. The kidneys exposed, natural size.



Fig. 1.

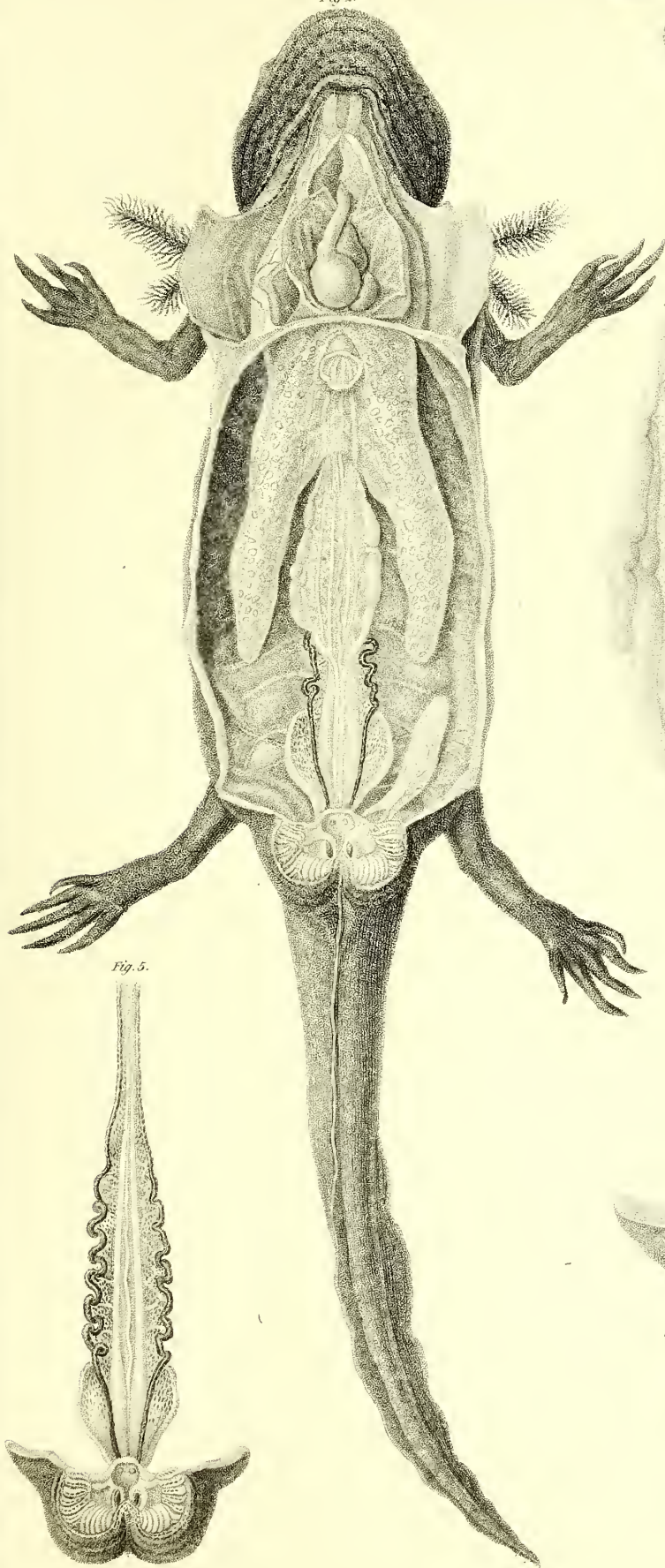


Fig. 3.

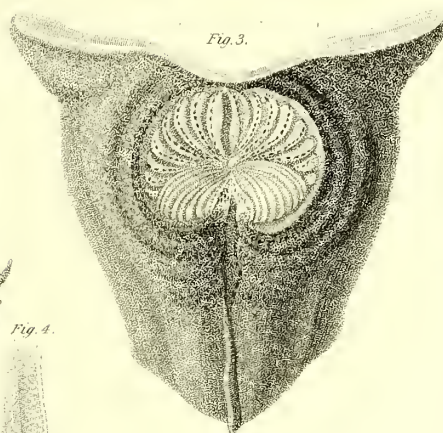


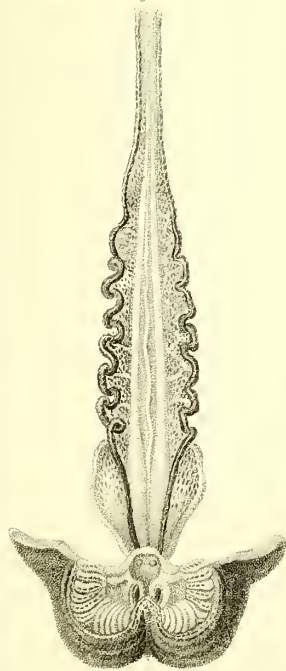
Fig. 4.



Fig. 2.



Fig. 5.





**PLATE LIX.**

**The FEMALE ORGANS of the MEXICAN PROTEUS.**

This plate contains nine figures.

Fig. 1. The female proteus laid open to show the ovaria and oviducts in complete development.

Fig. 2. The ovaria and oviducts, magnified two diameters.

Fig. 3. These parts in a virgin state.

Fig. 4. The oviduct, of the natural size.

Fig. 5. The funnel-like opening of the oviduct, when ready to receive the ova, magnified four diameters.

Fig. 6. The ova inclosed in the ovarium, magnified four diameters.

Fig. 7. An ovum, magnified six diameters.

Fig. 8. An ovum laid bare, magnified six diameters.

Fig. 9. An ovum laid open, magnified six diameters.



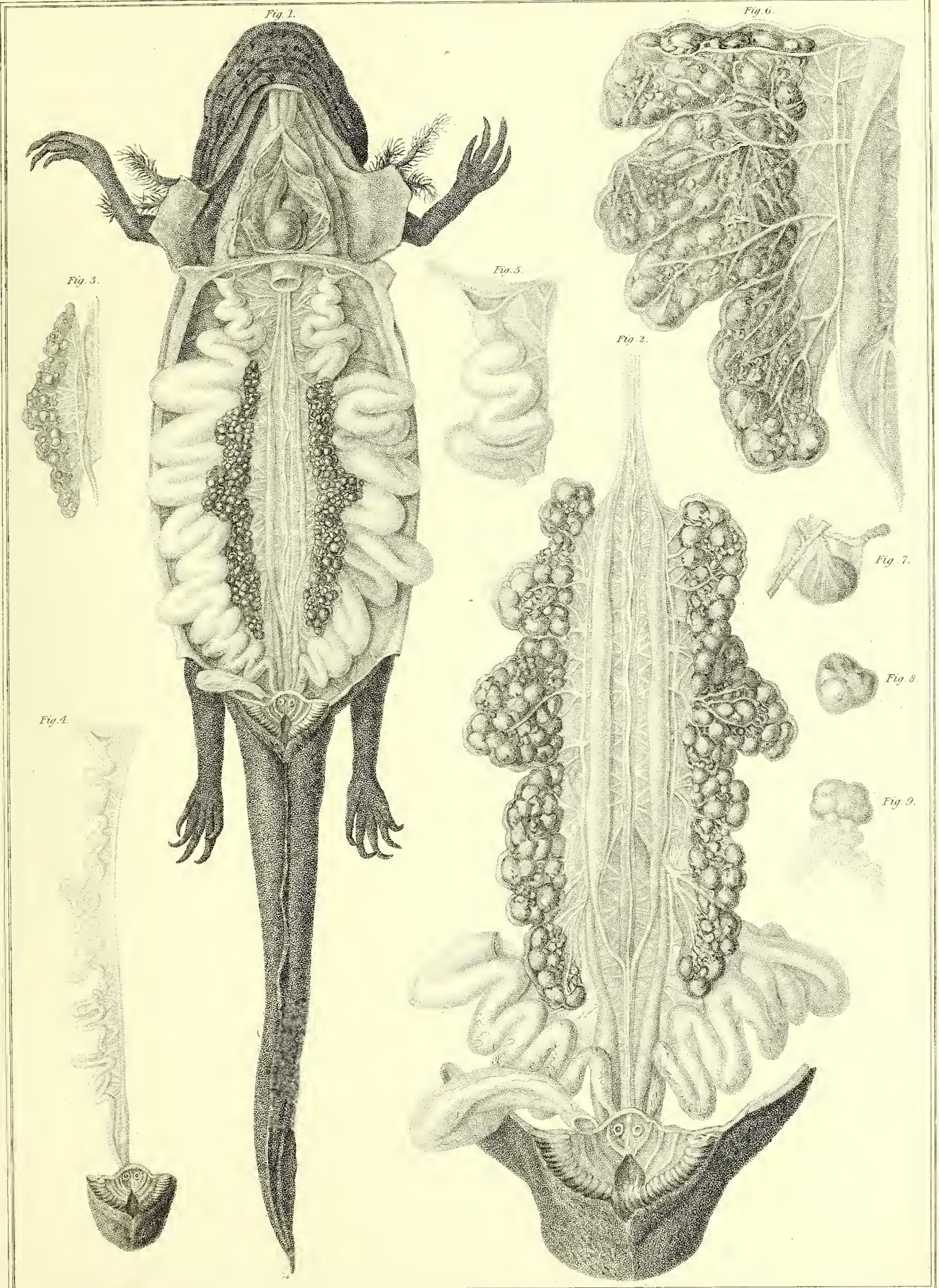




PLATE LX.

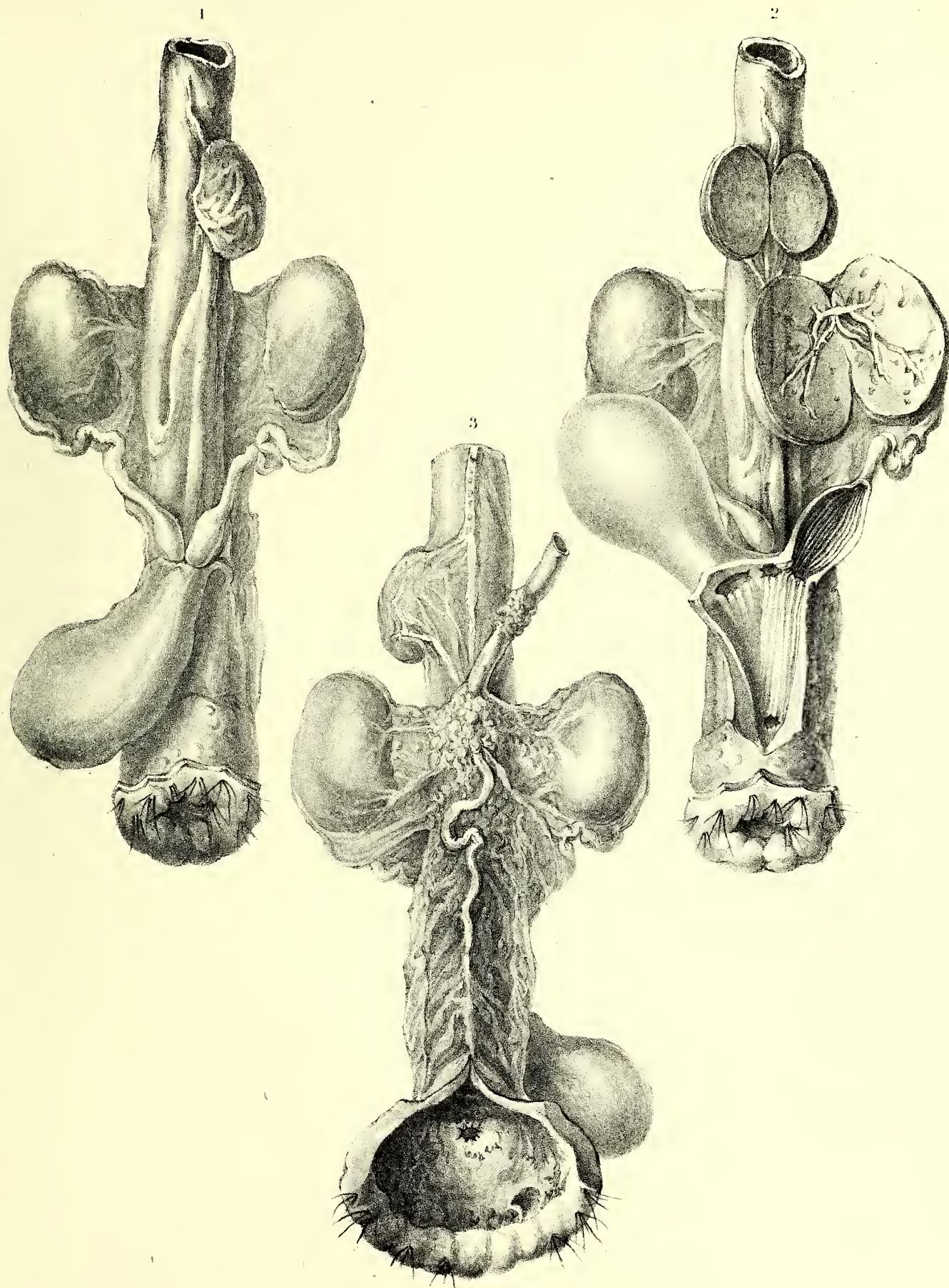
The FEMALE ORGANS of the ORNITHORHYNCHUS HYSTRIX.



The vagina into which the penis is received in the act of copulation, and the openings of the Fallopian tubes, on each side of the orifice of the urethra.

The ovaria and the Fallopian tubes, in the lower part of which the albumen is added to the yolk ; also the cloaca, in which the ovum is afterwards deposited.







**PLATE LXI.**

The PLACENTA, inclosing the FÆTUS of the HYRAX CAPENSIS.

Fig. 1. The maternal portion of the placenta is shown, connected with the chorion, in which the foetus is inclosed.

Fig. 2. The foetal surface of the placenta, and a small portion of the funis umbilicalis, showing the manner in which the arteries are distributed, dividing the placenta into three lobes.

The ramifications of the artery on two of the lobes only are seen, those on the third are on the opposite side.

In my account of this placenta, in the fifth volume, which was taken before the placenta was cut open, the lobes, upon a superficial examination, appeared to be five, and I stated that they had such an appearance, but referred the reader to this place for a more accurate description than could be made at that time.

The parts are of the natural size.



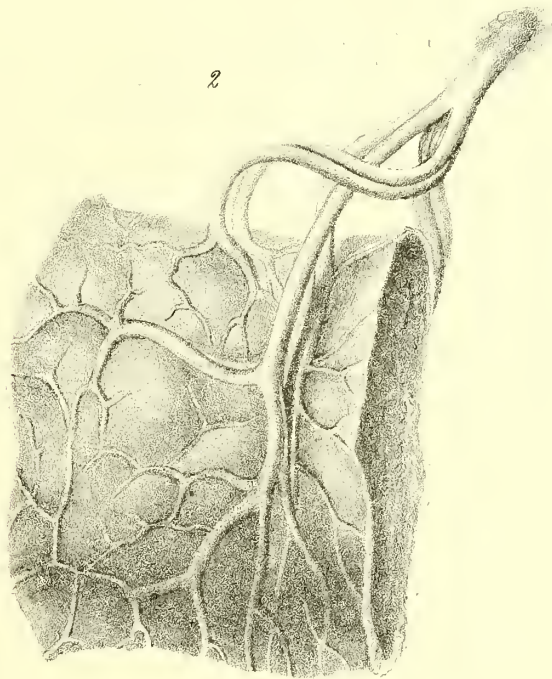
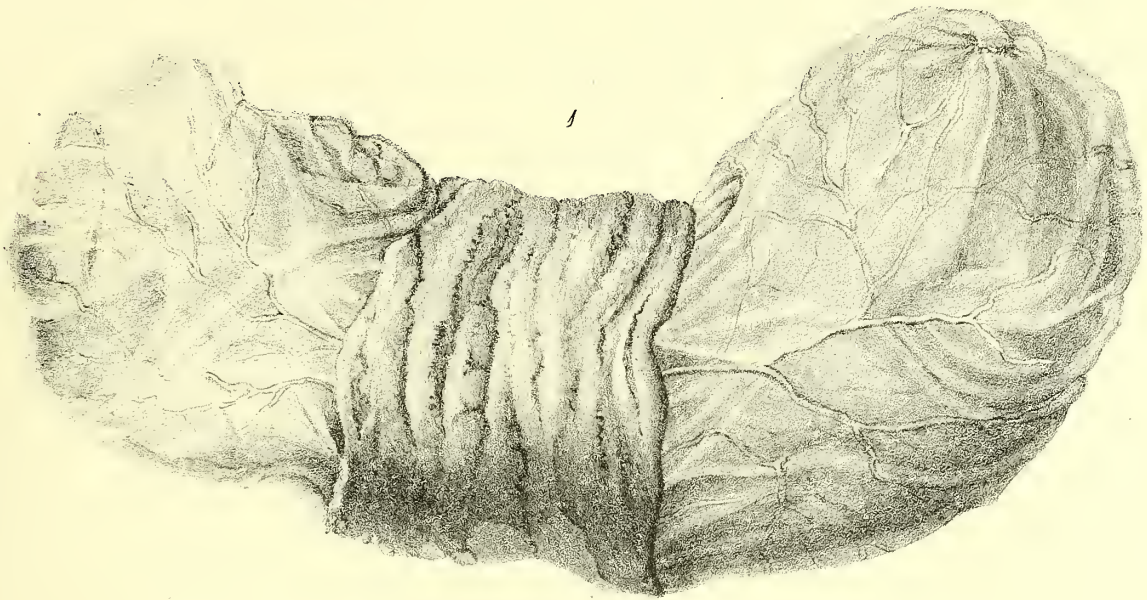




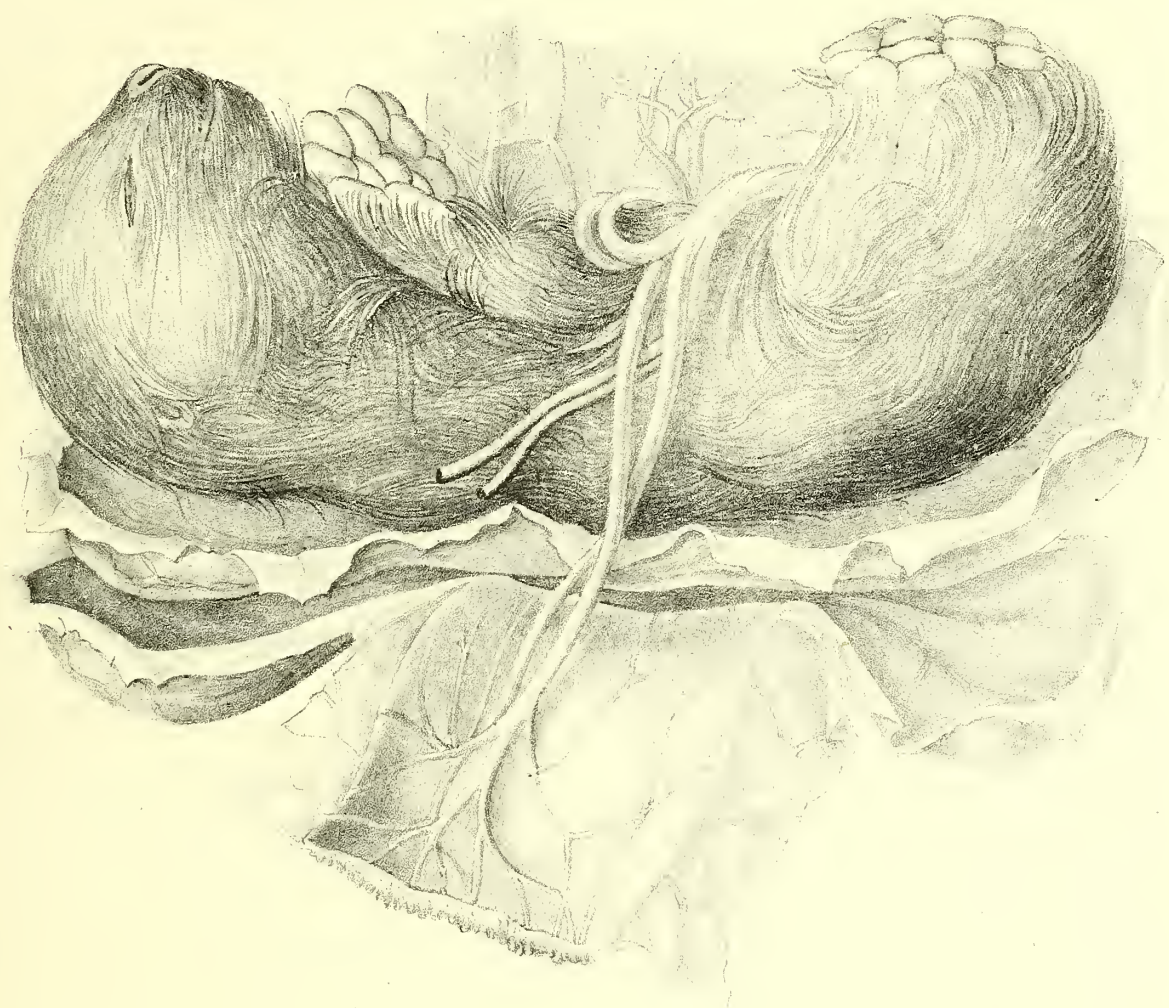
PLATE LXII.

The PLACENTA and FÆTUS of the HYRAX CAPENSIS.

In this plate, the placenta and the membranes are divided by a longitudinal section, and turned aside, exposing the foetus lying upon its back, so as to show the origin of the umbilical chord at the navel, and the ramifications of the artery upon one of the lobes of the placenta.

The parts are of the natural size.







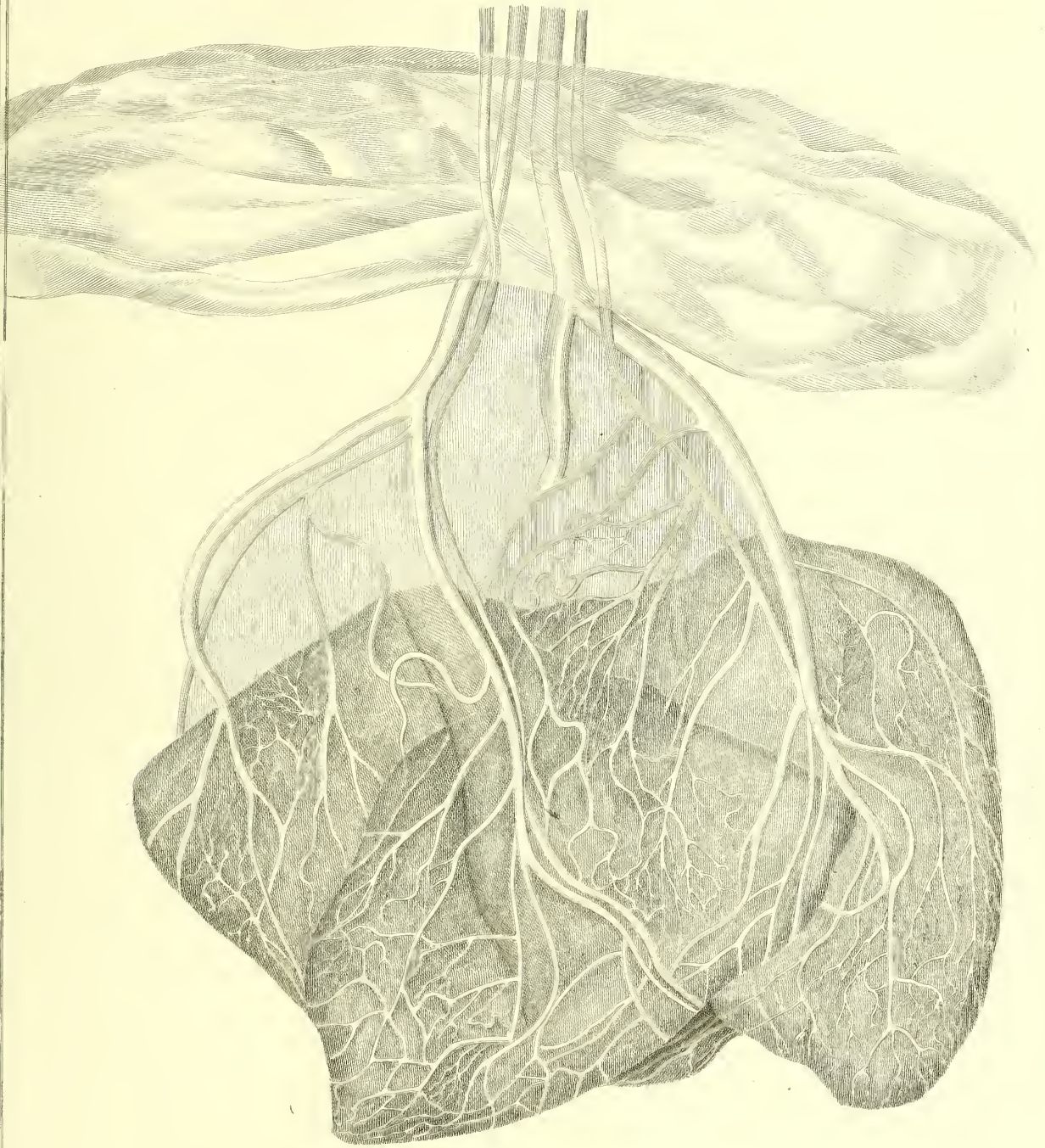
## PLATE LXIII.

The PLACENTA of the SEAL, showing the structure of that organ, and the number of its lobes.

The placenta of the seal is made up of five lobuli, but they cannot be considered as altogether distinct from one another.

The parts are of the natural size.





One inch to two.



## PLATE LXIV.

This Plate represents the POSTERIOR LOBE of the HUMAN  
PROSTATE GLAND.

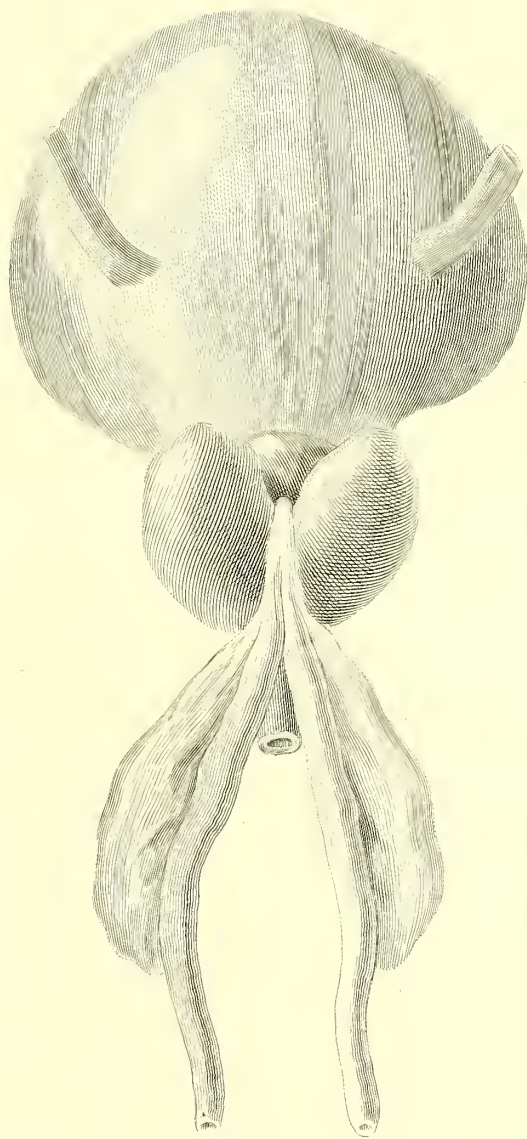
This lobe I discovered many years ago, and published an account of it in a work upon the Diseases of the Prostate Gland.

I have given the plate a place in this work, in which all my other discoveries in human and comparative anatomy are registered, to which it therefore properly belongs.

The external surface of the third or posterior lobe of the prostate gland laid bare, exposing its form, as well as its connection with the two lateral lobes, between which it lies, completing the circular belt by which the urethra at that part is surrounded.

The parts are of the natural size.







*The three following Plates are published in my work on “ Strictures  
in the Urethra ;” but as they exhibit only the natural structure,  
I have given them a place in this volume.*

## PLATE LXV.

Sections of the PENIS, to show the parts of which it is  
composed.

This plate consists of two figures.

Fig. 1. shows the internal structure of the corpora cavernosa.

The penis was in a state of erection at the time the person died, and the blood had coagulated in the cells so as to show them to great advantage by being distended.

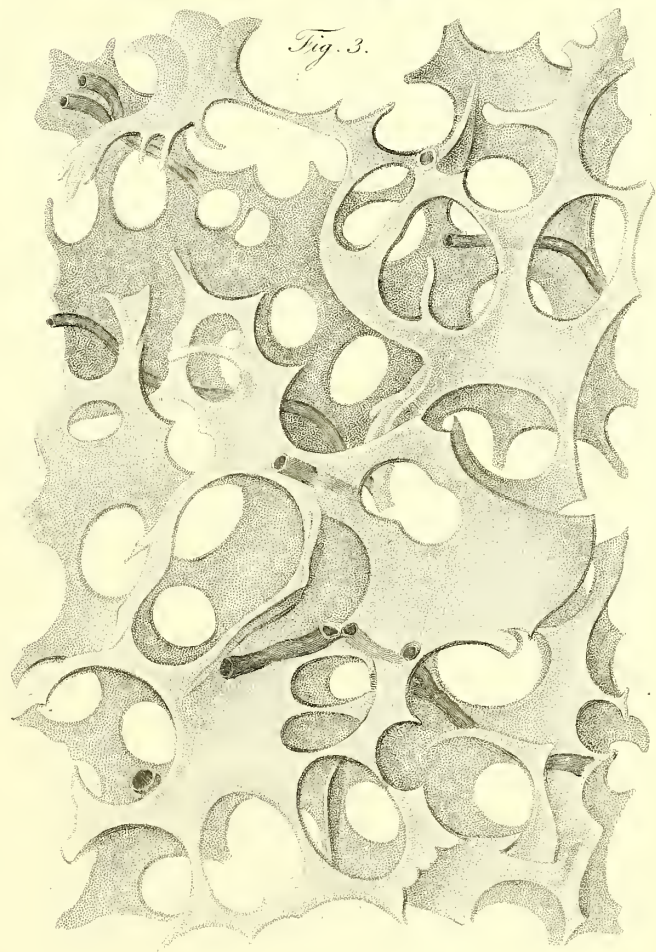
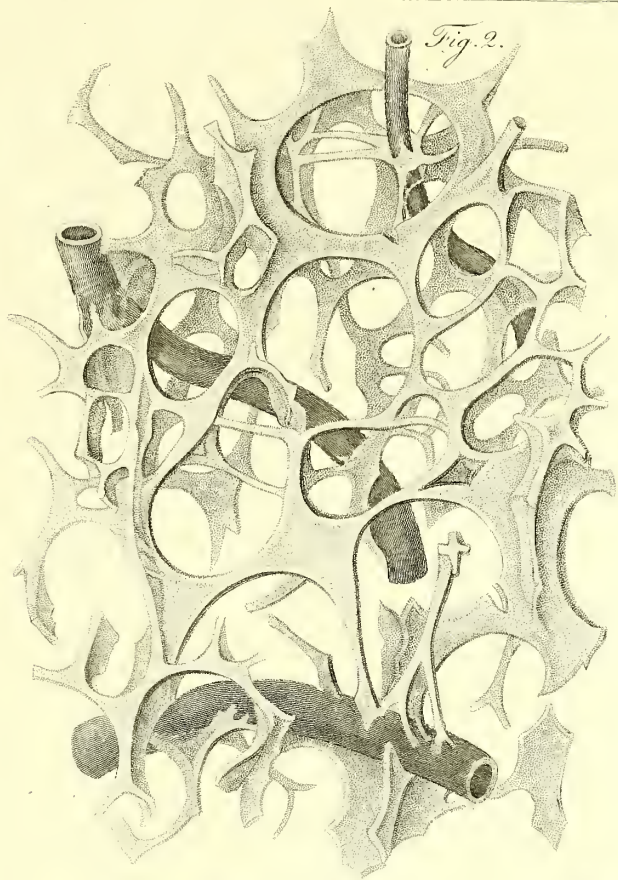
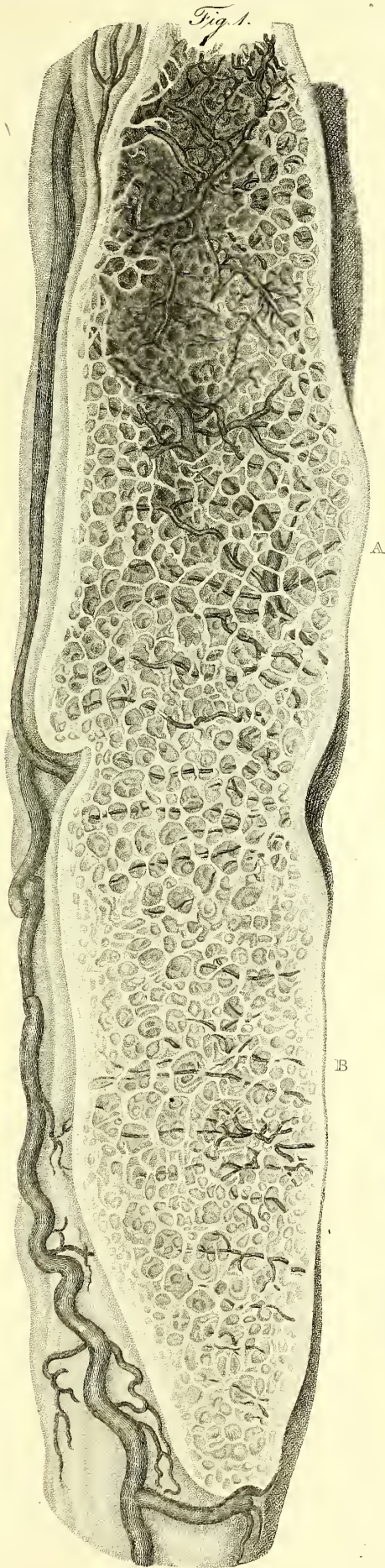
This section shows these parts near the middle of the penis, where they form one general cavity surrounded by an open trellis-work. The arteries that supply the cavity are distinctly seen.

The *arteria ipsius penis*, and the great nerve, are conspicuous in the ligamentous substance of the *dorsum penis*.

In the middle of the *corpus spongiosum*, the urethra is seen compressed into a slit by the surrounding muscular longitudinal coat.

Fig. 2. represents a section nearer the glans at this part; the corpora cavernosa consist of an open trellis-work, but there is no central cavity.







## PLATE LXVI.

Sections of the HUMAN PENIS, to show the difference of  
its structure in different parts.



This plate consists of four figures.

The first figure is a section of the penis near the crura, the parts are magnified two diameters.

The second figure represents the same parts, magnified fifteen diameters, and shows the single plates of which the trellis is composed.

Fig. 3. A transverse section of the penis, near the glans, magnified two diameters.

Fig. 4. A small portion of the parts represented in fig. 3., magnified fifteen diameters.



Fig. 1.

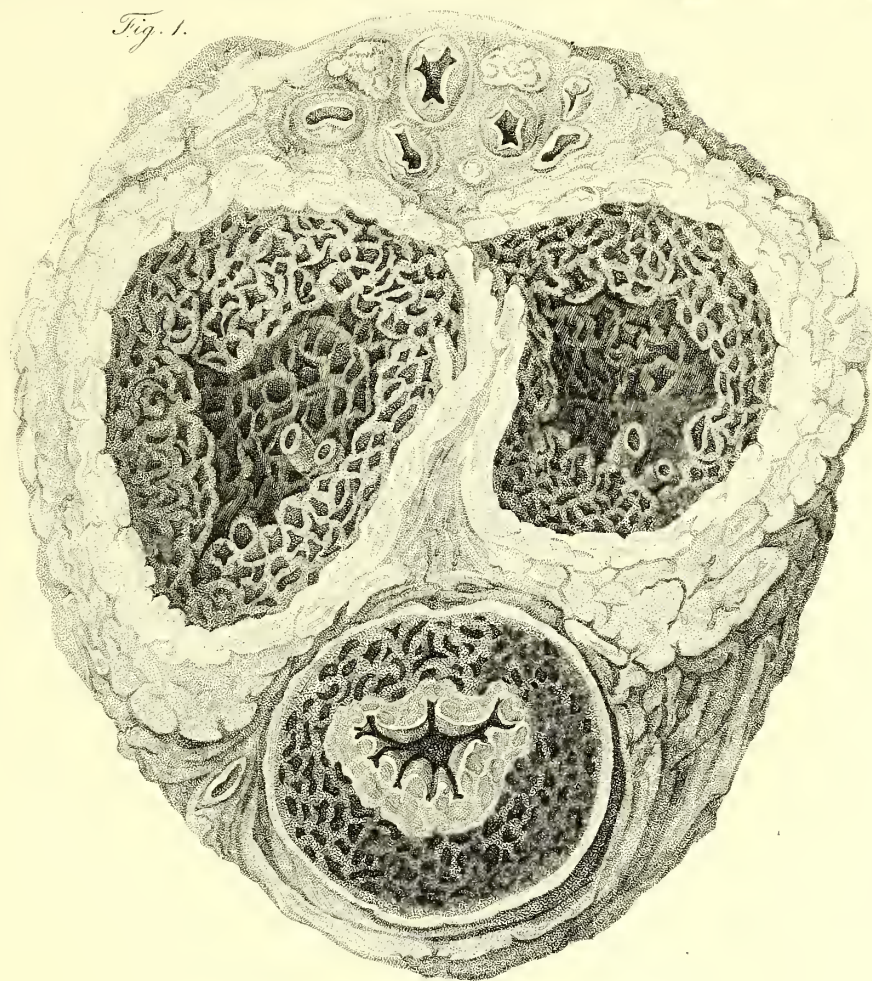
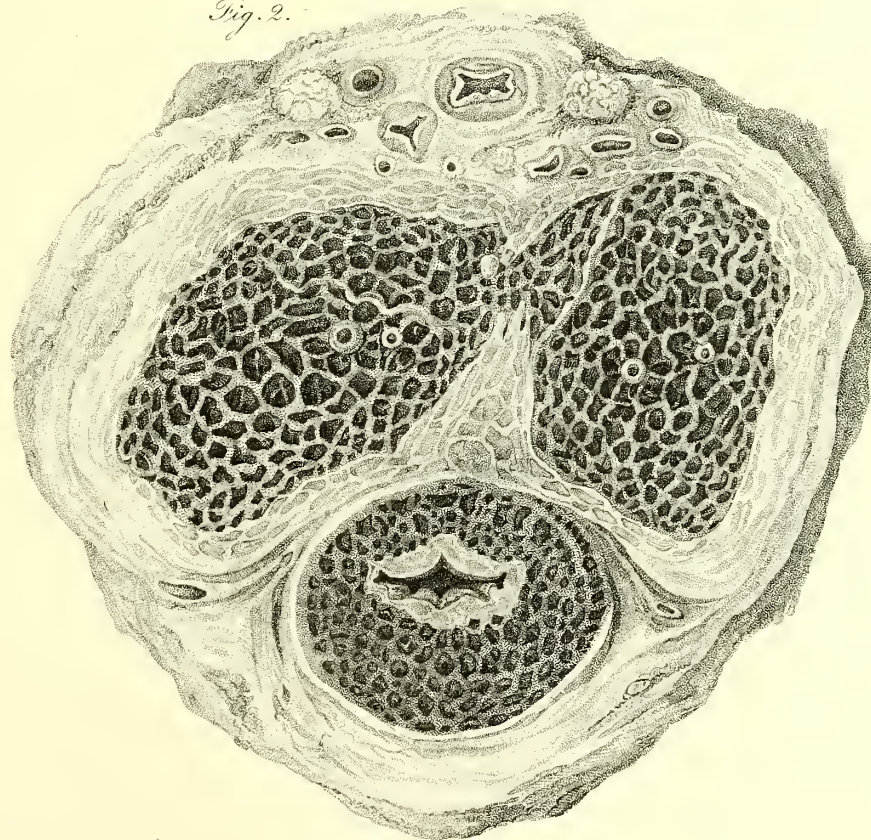


Fig. 2.





## PLATE LXVII.

In this Plate is shown the INTERNAL STRUCTURE of the  
CORPORA CAVERNOSA PENIS.

Fig. 1. A longitudinal section of one of the corpora cavernosa, showing the course of the arteries through the trellis-work, magnified two diameters.

A, opposite where the central cavity is seen.

B, where it is wanting.

Fig. 2. A small portion at A, magnified fifteen diameters.

Fig. 3. A small portion at B, magnified fifteen diameters.



Fig. 1.

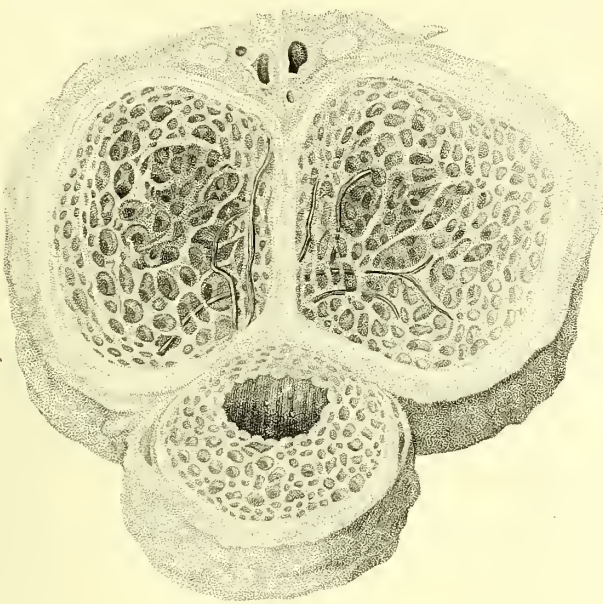


Fig. 3.

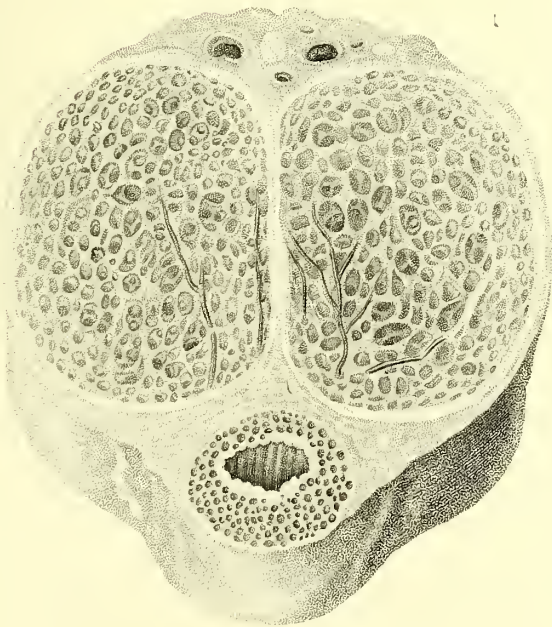


Fig. 2.

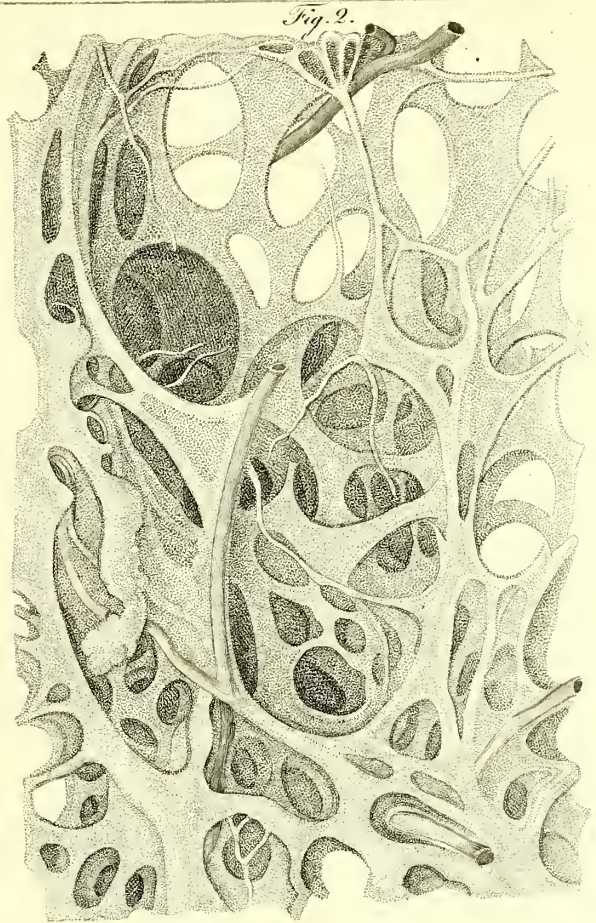


Fig. 4.





## PLATE LXVIII.

This Plate shows the INTERNAL STRUCTURE of the CORPUS SPONGIOSUM URETHRÆ, the appearance of the inner membrane of that canal, and the nervous papillæ on the surface of the glans penis.



This plate consists of six figures.

Fig. 1. A transverse section of the corpus spongiosum urethræ, magnified four diameters, exposing the cut ends of the arteries leading to the branches that supply the trellis-work.

Fig. 2. A portion of fig. 1., magnified fifteen diameters, to show the trellis-work.

Fig. 3. A longitudinal section of the corpus spongiosum, and muscular coat, magnified fifteen diameters.

Fig. 4. The internal membrane of the urethra, with the glands and lacunæ, also the fasciculi of muscular fibres seen through the membrane, magnified ten diameters.

Fig. 5. The nervous papillæ upon the surface of the glans penis, magnified ten diameters.

Fig. 6. A small portion of the surface of the glans, to show the papillæ more distinctly, magnified twenty-five diameters.

These papillæ are exactly similar to those upon the clitoris, which have been already represented and fully described.



Fig. 1.

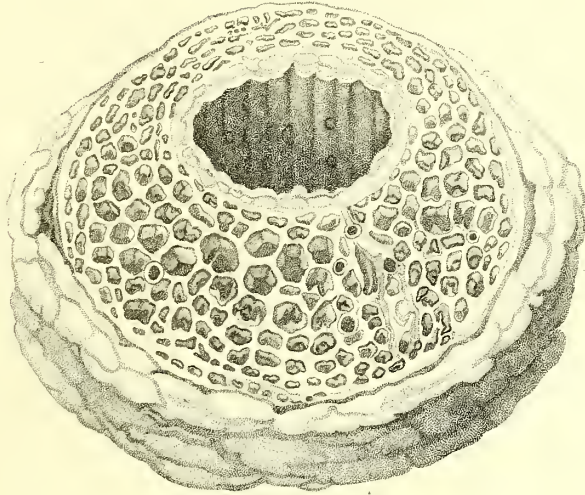


Fig. 2.

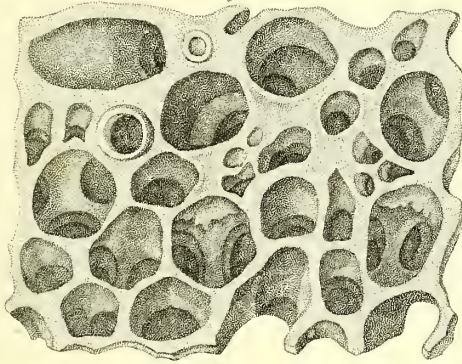


Fig. 5.

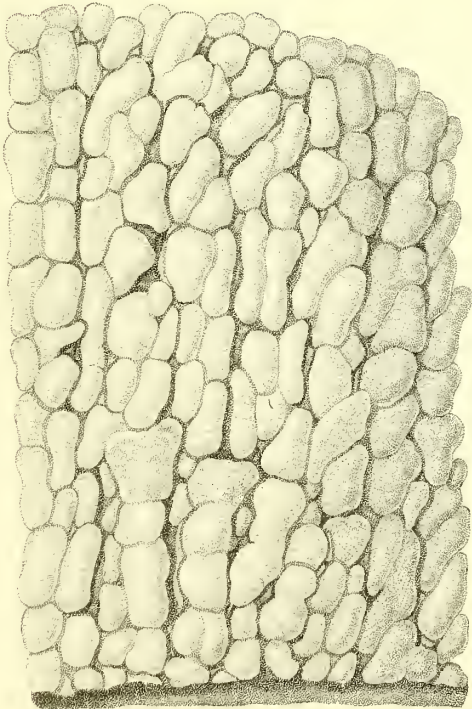


Fig. 3.

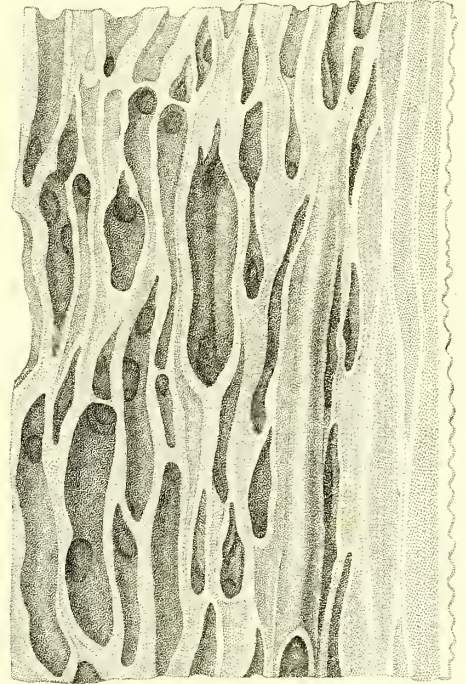


Fig. 4.

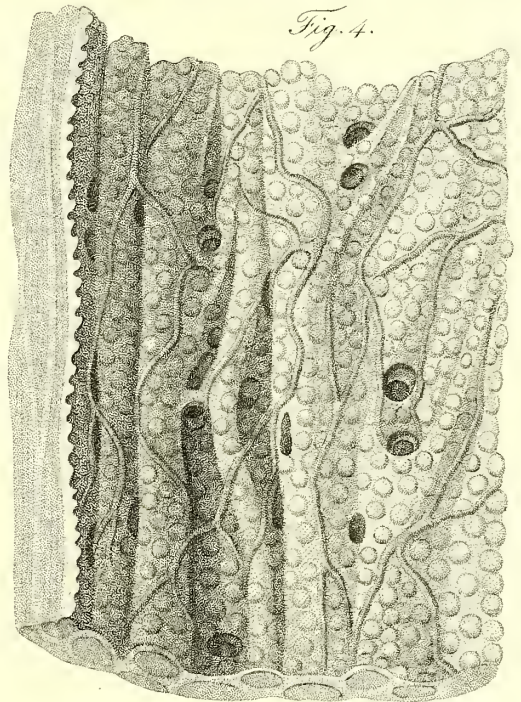
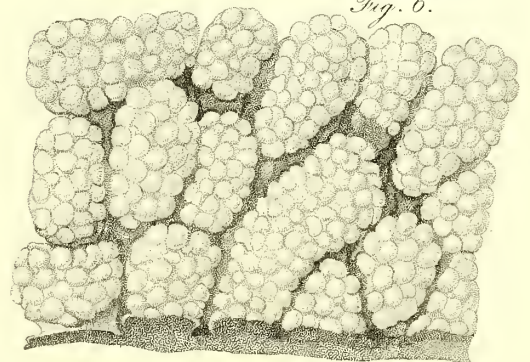


Fig. 6.





A GENERAL ALPHABETICAL  
**INDEX OF THE PLATES**

CONTAINED  
IN THIS AND IN THE FORMER VOLUMES OF THIS WORK.





## GENERAL INDEX OF THE PLATES.

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THE END.

LONDON :

Printed by A. & R. Spottiswoode,  
New-Street-Square.



